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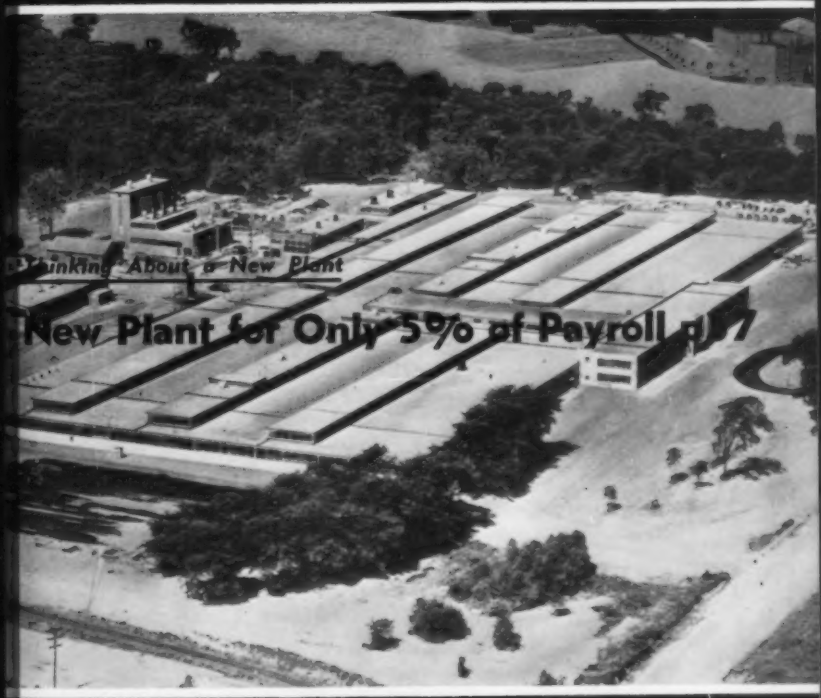
JUNE 1950

BUSINESS · ENGINEERING · INDUSTRY



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World Traders EVERYWHERE

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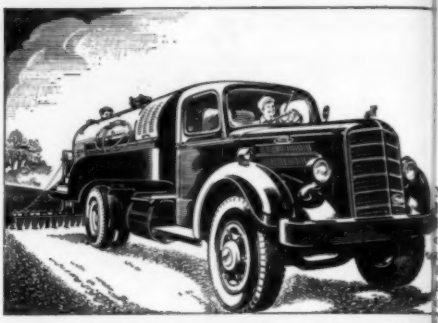

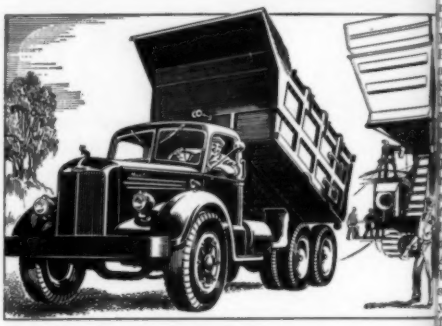

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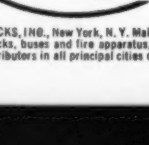

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McGraw-Hill DIGEST

VOLUME 5
NUMBER 6

Member—Audit Bureau of Circulation

McGraw-Hill Digest is published monthly by McGraw-Hill International Corp. for circulation in all countries of the world except the United States and Canada. Publication and executive offices, 330 West 42nd St., New York 18, N. Y., U. S. A. Curtis W. McGraw, Chairman of the Board; Willard F. Chevalier, President; Eugene P. Warner, Vice-President and General Manager; Joseph A. Gerardi, Secretary and Treasurer; John F. Chapman, Vice-President; K. Presbrey Bliss, Vice-President and Director of Advertising; J. E. Blackburn, Jr., Director of Circulation. *Subscriptions may be ordered through Director of Circulation, through local book dealer, or McGraw-Hill, Aldwych House, London, W. C. 2 (British only).* Subscription rates: $5 for 1 year, $8 for 2 years, or $10 for 3 years; single copy 50¢ (U. S. currency). Entered as second-class matter December 17, 1947, at the post office at New York, New York, under the Act of March 3, 1879.

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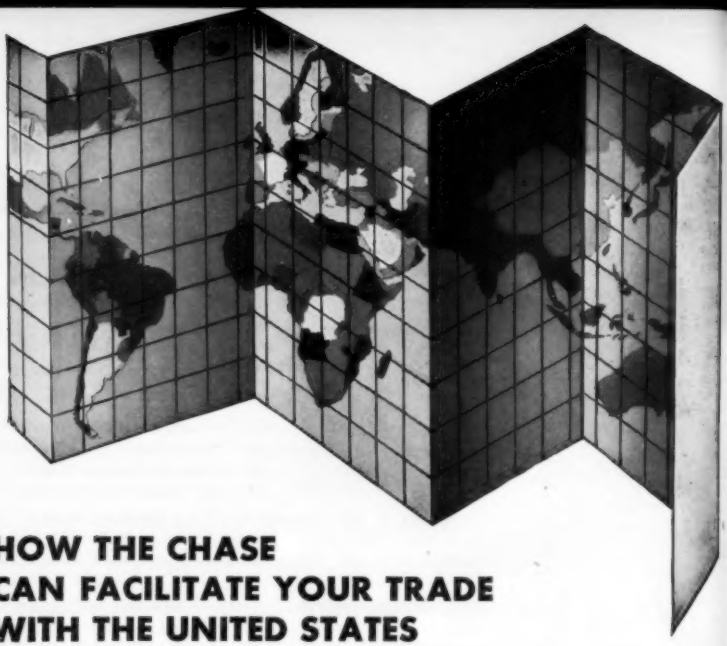

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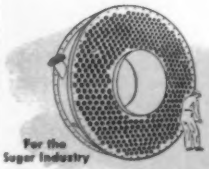

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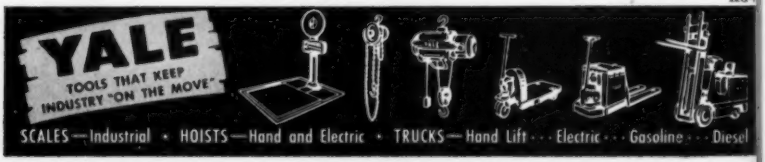
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Business Trends

U. S. BUSINESS OUTLOOK for the second half of 1950 appears much brighter than it did 6 months ago. The boom in construction is continuing. Military expenditures are expected to rise by about $1-billion. An upward revision of industry's plans for purchases of new plant and equipment is in sight. Together these developments promise to keep the economy in high gear.

Prosperity for the balance of 1950 is foreseen by the American consumer, according to a survey conducted by the Federal Reserve Board. Consumers expect their income to remain high, and they plan to spend at a fast rate. Consumer spending will help keep present prosperity. Here are survey highlights:

- **The housing boom** will continue in 1950 and in 1951. Over 1-million consumers plan to buy a new house in 1950, and almost an equal number plans to do so in 1951. As long as the housing boom continues, there will be an excellent market for appliances and furniture—and many opportunities will remain open to the foreign producer.
- **Automobile demand** in 1950 equals the record 1949 level. Gloomy predictions were made by economists who thought that the automobile market would be saturated by the middle of the year. They look wrong now.
- **The television boom** has surpassed the most optimistic expectations. According to the Federal Reserve survey, more than twice as many television sets will be sold in 1950 as in 1949. Other appliances too will sell.

LONG-RANGE U. S. TRADE POLICY program is in the making. President Truman appointed Gordon Gray, former Secretary of the Army, as special assistant on the dollar problem. Gray's assignment: to coordinate the work now done by other departments and to organize a policy committee, like the Harriman committee that outlined U. S.'s part in the Marshall Plan. Ultimately, the committee is counted on to evolve a long-range program to remedy the dollar situation and to keep trade flowing. Meanwhile . . .

New tariff parleys will be held in Torquay, England, starting in September. The U. S. will negotiate with 17 nations on a reciprocal basis and may cut tariffs on as many as 2,500 products. The benefits of the tariff cuts will be extended to all 40 participants of the conference.

The most important negotiations will be with Western Germany, Canada, and Great Britain. U. S. has not held trade talks with the Germans since 1930, and there is a large list of important products on which tariffs could be reduced. These include chemicals, steel specialties, and optical instruments. Britain will request tariff reductions on clocks, scientific instruments, woolen and linen cloth, whiskey, and many other products.

Mounting opposition to tariff cuts in the U. S. makes it likely that no further cuts in U. S. tariffs will be made after the Torquay parley. The Reciprocal Trade

Business Trends (Continued)

law, under which the negotiations are conducted, expires in June 1951. As things look now, it may not be extended. Mounting competition of foreign goods and fear of unemployment give ammunition to protectionists.

BRITISH AUTOMOBILE MAKERS launched their drive for an increased share of the American market with an exhibit in which 22 makes and over 100 models were represented. The British goal: to sell 50,000 units in the U. S. in 1951. British manufacturers hope to tap the lowest-price bracket ($1,000 to $1,500) and, at the other extreme, the luxury-class market. But U. S. dealers doubt whether the British will be able to sell their low-price products in view of American competition. And the luxury market is quite small.

Licensing of British-built taxicabs for use in New York City shows that the American automobile market provides opportunities for foreign makers in spite of stiff competiton. The British cab is some 4 ft. shorter than American cabs—a great advantage in overcrowded Manhattan—and yet is equally roomy. The British product also costs about $750 less than American cabs.

NOTES ON WORLD BUSINESS AND COMMERCE

Canada will be hurt by the tapering off of the Marshall Plan aid to Europe. ERP purchases in Canada last year were estimated at $400-million. The influx of dollars helped Canada accumulate a reserve of $120-million. Without ERP dollars, Canada might have had a dollar deficit.

Canadians have hope, however. They are selling more to the U. S. February exports to the U. S. were 21% above the level of February 1949. There were no indications that the upward trend would be interrupted. Even with a continuing gain, though, trade experts believe that Canada will have to impose new trade controls to preserve her dollar position when ERP ends.

France is on the eve of a building revival. Stringent rent controls, in force since the World War I, and high prices of building materials have practically stifled all building activity. Since the war, France has rebuilt only 7½% of the 450,000 homes destroyed. Most of the new homes were Government-built. Returning confidence in the currency, an increasing abundance of building materials, and the partial relaxation of rent controls are beginning to stimulate private building. Builders will be encouraged by bonuses.

Japan's foreign-trade picture is dark in spite of $2-billion received in U. S. aid since the end of the war. Japan has lost its fleet; the important Chinese market is gone—at least temporarily—and silk has been largely displaced by artificial fibers throughout the world. Japan, like Britain, has to trade in order to live. Last year, Japan exported only $511-million worth of goods. This year, exports are unlikely to reach $600-million. Twice as much is needed if Japan is to pay its own way.

Gear errors and Gear noise

should be discovered long before the gears reach final assembly...

There is a profit in scrap for the scrap dealer, but most certainly not for the gear manufacturer who suddenly discovers that an entire lot of gears have to be scrapped because they fail to meet tolerance requirements or because they are too noisy.

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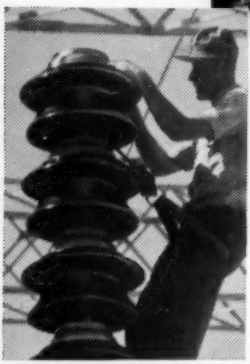

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THE UNCTUOUS NATURE OF METALLIC STEARATES makes them particularly useful as dry lubricants in molding ceramic electrical insulators such as those shown here. Cyanamid's AERO* Brand Stearates are specially compounded to offer varying degrees of waterproofing, lubricating, dispersing and gel-forming properties for countless industrial applications.

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REPRESENTATIVES THROUGHOUT THE WORLD

Washington Report

AN ATLANTIC COMMONWEALTH: that is the West's long-range answer to Russia. Military, economic, and maybe sometime political union between Western Europe and North America is a possibility—if the U. S. Congress will go along. The administration is prepared to call this the price of peace with Moscow.

An Atlantic community on the British Commonwealth pattern has long been the top policy objective of men like State Dept.'s George Kennan. Most ECA officials agree. They see little hope for freeing Western Europe's trade or knitting Western Germany into the western economy unless Western Europe is absorbed into a larger community. The plain fact is that Western Europe can no longer exist as an independent unit. Its only chance of survival is to find leadership in the West or to join with Russia.

Secretary Acheson's plea for total diplomacy underlines the interdependence of the western world. At the Hague this spring, western military leaders spelled out military interdependence specifically: The U. S. will concentrate on sea and air power, Europeans on land power. But the generals agreed that their strategy will never get off paper without an equally tight economic and political alliance.

The London conference of foreign ministers last month laid the ground work for broadening the Atlantic Pact to include an economic and political alliance. But do not expect any tangible results until after Gordon Gray makes his report to the President on post-Marshall Plan aid this fall. Gray is studying steps the U. S. may have to take to continue plugging the dollar gap after 1952.

Increased arms aid to Western Europe may be the first result of the London conference. Then the drive on U. S. tariff barriers will be stepped up.

YOUR SELLING JOB in the U. S. will be easier—thanks to ECA's new trade promotion division. ECA is sending overseas a corps of marketing experts to advise Europeans businessmen how to make their wares sell better in the U. S. An adviser will be attached to each country's mission. Ralph I. Straus, formerly of New York's Macy's department store, is heading up the operation in Paris.

ECA's trade promoters will advise you:

- **Where to sell.** Example: go west—exploit the rich markets beyond the Atlantic seaboard.
- **How to tailor your product** to fit American taste. Packaging counts.
- **Where to get credit** (in Europe) to finance your shipments.
- **How to get through** the complicated U. S. customs maze.
- **How to get space** at U. S. trade fairs.
- **Who should push your product** in the U. S.—your own representative or an American import house.
- **How to use U. S. foreign-trade zones.** ECA hopes to see the six foreign-

Washington Report (Continued)

trade zones in the U. S. grow into "department stores for foreign merchandise." Legislation now before Congress would allow you to ship your product to a zone, assemble it with a domestic or imported component, and display it to prospective buyers—all without going through U. S. customs or posting bond for warehouse storage (see McG-H Digest, Apr, p17).

ARGENTINA'S BACKLOG of debts to U. S. exporters is now virtually assured of U. S. financing. A syndicate of private banks, backed by an Export-Import Bank guarantee, will probably do the job. Ex-Im Bank is none too enthusiastic, but State Dept. is putting on a lot of pressure.

U. S. LOAN TO PEMEX, Mexico's nationalized oil industry is now favored by State Dept. Ex-Im Bank is against it, but the State Dept. may win this one too. U. S. companies are involved in Pemex expansion plans.

The U. S.-Mexican trade agreement is sure to be scrapped. For 2 years, the U. S. has been protesting in vain against Mexico's decision to raise tariffs to compensate for new peso rates. No progress has been made, so the treaty will go. Result: tariffs on a number of metals and minerals will go up a bit; oil tariff will go up 2 cents a bbl.

RUSSIA'S BID for more U. S. trade backfired. In February, the Russians stepped up shipments of chrome and manganese as bait for more U. S. exports. The Commerce Dept. reacted by tightening export controls on several strategic items. New restrictions apply to anywhere in the world, outside of the Western Hemisphere. Object, of course, is to make it tougher for the Soviets to get U. S. goods through third markets.

STATE DEPT. IS DOING a lot of scolding these days. Reason: too many countries in the world are operating on the assumption that U. S. aid will never stop. Each country figures its value in the cold war is such that the U. S. cannot afford to refuse dollar aid—so why worry about getting along without it or even trying to get along without it.

Greece, Italy, and Korea have already been warned that this thinking is dangerous. In each case, the U. S. advised the government to make a determined effort to solve its economic problems or forget about any more help. (In Greece, at least, the reaction was quick. Out went the minority government of Premier Venezelos; in came a broad coalition, lead by the moderate leftist, General Nicholas Plastiras.)

Next candidate for the tough treatment may be Indonesia. State Dept. does not like the way President Soekarno is centralizing power in his own hands. Indonesia is supposed to be a federation of states. State Dept. is also worried by reports that Indonesia leaders want to recognize Moscow soon.

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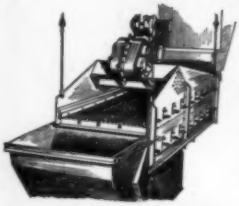

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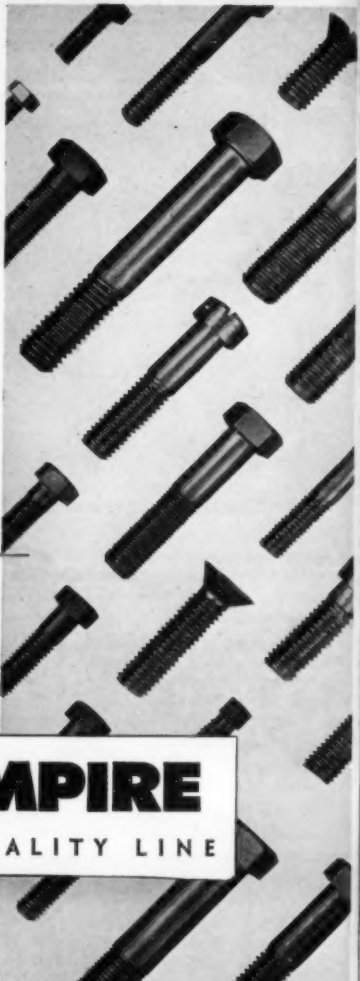

104 Years Making Strong the Things that make America Strong

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June 1950 • McGraw-Hill DIGEST • Volume 5 Number 6

ECA Trade Division Formed To Increase Europe's $ Exports

Europe can increase dollar exports—by sales promotion, smart restyling, selling. ECA starts drive to show how it can be done

PARIS—An all-out frontal assault on the No. 1 problem of the Marshall Plan—the dollar gap—has been launched by the Economic Cooperation Administration. ECA's new International Trade Promotion Division (see p15) will be the general headquarters for this offensive.

Most other ECA-sparked programs have attempted to outflank the basic hurdle of how to bring Western Europe's dollar earnings into line with its dollar spending. Examples: the programs for integrating Western Europe economically through such mechanisms as customs unions, regional economic unions, payments schemes, reduction of quantitative trade barriers, and now the European Payments Union.

All these schemes stem from the theory that by increasing the size of the European market competition will increase and hence the competitive efficiency of European producers. The objective is to groom them to compete for dollars in the U. S. market or to earn dollars in third markets.

To Tackle Dollar Gap

The International Trade Promotion Division, in contrast to such roundabout approaches, will tackle the dollar gap head on. Method: to boost Western Europe's exports to the U. S. through a direct, two-pronged attack on Western European sellers and American buyers.

But ECA officials directing the program know they are in for a long fight. But they do hope to lay the groundwork for a continuing effort to bring the trade of the western world into balance.

The long-range strategic objective of the new division is to change fundamentally the thinking of the whole Atlantic business community—in the U. S. as well as in Europe. This will mean revolutionizing, at the business-men level, the trading habits developed during 150 years of protectionism and two world wars.

Europe Must Sell

Individual Western European businessmen must be incited to go out and sell in the U. S. And U. S. businessmen must be given incentives to buy from Western Europe. The obstacles to such a development in Atlantic trade are many and high.

First, the bulk of Western Europe's exports is manufactured products, particularly vehicles, machinery, and metal products. But finished manufactured goods make up less than 20% of U. S. imports.

Second, European manufacturers have less incentives to export now than they once had. Fifty years ago, many European manufacturers sold a big part of their production abroad. Such foreign sales tended to snowball. Also, European producers had relatively little competition from local producers in many markets and selling expenses were low.

Today the situation has changed radically. Best markets of most European manufacturers are in Europe where widespread inflation and government determination to maintain full employment at almost any price has led to easy profits and a high degree of security and accessibility. Selling to the home market also

Trade Division's Objective—More Dollars

avoids costly and troublesome styling problems.

The U. S. market is particularly forbidding to the foreign trader. Tariffs are moderately higher. Customs procedures are frequently arbitrary, complicated, and capricious. Initial selling costs are staggering, particularly for the small specialty exporter who is counted on for most of the expansion of European exports. And marketing costs must be paid in scarce dollars.

European Exports to U. S. Down

The end result of all these factors has been a long steep decline in Western European exports to the U. S. starting at the beginning of the First World War. Roughly half of all U. S. imports came from Western Europe between 1900 and 1913. This share sagged to 25% in the inter-war period. Now the U. S. buys less than one-tenth of its total imports in Western Europe. Imports from Western Europe added up to 2% of the gross national product of the U. S. during the first decade of the century. They now represent less than 1/3 of 1%.

Immediate tactical objective of the Trade Promotion Division in Europe will be to nudge and prod Marshall nations' governments to take some of the following practical steps:

1. One is to offer new incentives to exporters to attack the U. S. market. Most effective incentive so far has been permission for exporters to keep part of their dollar earnings in dollars (McG-H Digest, Feb, p17). But ECA in addition to pushing for this will encourage Western European governments to devise other types of incentives, perhaps in the form of tax concessions and so forth.

2. The Trade Division will urge Marshall nations to make the maximum possible amount of dollars available to exporters for visiting the U. S., covering initial selling expenses, building up stocks of spare parts and merchandise in the U. S., buying raw materials and equipment freely.

3. Western European nations also will be urged to offer maximum export credit facilities to their foreign traders at every level—publicity, market research, transportation, storage, stockpilling.

4. They will be encouraged to make maximum use of, and to disseminate as widely as possible, official U. S. Government information about U. S. markets.

5. They will be urged to promote market research of all kinds, both official and private. ECA Technical Assistance funds already have been made available for this purpose.

6. Publicity campaigns, both at the private and official level, will be strongly recommended. The ECA also will urge Marshall governments to try to get small exporters to band together for joint publicity efforts that they would be unable to finance individually.

7. In general, the new division will try to get small exporters to work together in groups as far as is practicable at every stage of export operations.

8. Western European governments will be prodded to make full use of U. S. foreign-trade zones.

Catalysts to Speed Trading

But ECA leaders here know that even if all these actions are taken by the Western European governments, they will not narrow the dollar gap unless individual private exporters get out and sell. ECA trade men also know that a few American officials cannot tell European businessmen how to run their businesses. But they do hope to act as catalysts to speed up European traders' own efforts.

An operational pattern for the initial phase of their work is beginning to emerge. First step will be to encourage industrialists and traders to form na-

for Europe, Balanced Western-World Trade

tional dollar export committees like the Dollar Export Board in Britain. ECA will work through the Marshall governments, U. S. embassies, and ECA-country missions.

Detailed Studies Needed

The first job of such committees, as ECA sees it, will be to get down to an industry-by-industry, product-by-product, company-by-company study of just what really are the specific practical difficulties in the way of exporting to the U. S. Such a detailed industry-by-industry appraisal of the dollar export problem will lead to setting firm export targets, within the frame work of the committees, for each industry, company, and plant. Such targets will give direction and purpose to subsequent sales campaigns, just as they do in the case of large U. S. companies.

Once specific export problems are defined and export targets set by manufacturers and exporters working with the national committees, ECA will come back into the picture actively. It will provide Technical Assistance funds for market research, trips to the U. S., publicity campaigns. Its influence will smooth out specific legal or administrative difficulties and get the cooperation of the U. S. business community in solving specific problems of European exporters.

Needed: Dollar Export Boards

Some progress already has been made in setting up national dollar export committees in the Marshall nations. The British Dollar Export Board has been the most effective of these committees. Denmark, France, Ireland, Italy, Portugal, Sweden, and The Netherlands—all have some kind of committees working. Austria, Germany, Greece, Norway, and Turkey have the formation of committees under study. Belgium, Iceland, and Switzerland have export committees but not specifically dollar export committees. A second committee is under consideration in France. But, by and large, these committees have been ineffectual so far. The ECA will have to revitalize them or to set up new committees.

The Trade Promotion Division's drive to increase European exports to the U. S. is so new that it has not yet seeped down to the level of ECA country missions in any concrete form, let alone down to the individual foreign exporter. So it is impossible to judge now what the local campaigns and the local reactions to these campaigns will be.

Will the U. S. Buy the Goods?

ECA trade experts stress that no matter how successful they may be in stimulating Western Europeans to export, the whole drive will fail unless an even more strenuous effort is made to get the U. S. to buy the goods that are offered. This is the primary job of the Washington end of the division. First objective will be to get the proposed customs simplification act through Congress this year. Otherwise, the whole program may be fatally delayed. If rapid progress in boosting exports is not made before Marshall aid tapers off, odds are against it being made later.

ECA leaders here put the U. S. choice in simple terms: On the economic plane, either the U. S. decides to increase its own standard of living while making Europe viable by importing more European goods. Or it decides to continue subsidizing Europe at the expense of the American taxpayer and its standard of living for the profit of a few marginal interests. Or it decides to let Europe founder economically by doing neither.

Most ECA economists agree that, regardless of their economic merits, the last two courses probably would be politically, socially, and militarily fatal to the West in its struggle against Russian imperialism.

- **Transformers, switchgear, motors, and controls must stay in operation to maintain production.**
- **Operation depends on planned inspections, comprehensive check-lists, proper tools, and practical know-how.**
- **Dust and dirt, loose connections and overloads, vibration and moisture have no place in modern plants.**
- **Here are successful, time-tested hints and methods to insure continuity of electrical operation by . . .**

Modern Preventive Maintenance

1 *What is preventive maintenance of electrical equipment and why do I, as a manufacturer, have to worry about it?*

Doing something now when you don't have to do it so you won't have to do it later when you have to—that is preventive maintenance.

Its value cannot be overstressed because equipment is of little value when it is either not operating or operating ineffectively.

Preventive maintenance, distinguished from breakdown repairs, includes planned shutdowns, periodic inspections, comprehensive records, adequate stocks of replacement parts, proper tools, and a skilled maintenance organization.

2 *In planning a preventive-maintenance program, what parts of the electrical system should I consider?*

Practically everything—service entrance, overhead lines, underground lines, conduit systems, panelboards and switchboards, grounds, transformers, conductors and breakers, controls, motors, generators, ventilating and heating equipment, lighting, signals, industrial trucks, welding equipment.

3 *If we were to consider just a single line, running from transformers through switchgear and controls to motors, what steps should I take to keep transformers in top operating condition?*

First, treat transformers with respect. To use their full capacity, balance the loading because a heavy unbalance will result in high neutral currents, which seriously overload transformer windings. And adequate ventilation is important. So keep air flow past tubes unobstructed and keep the ducts and coils clean.

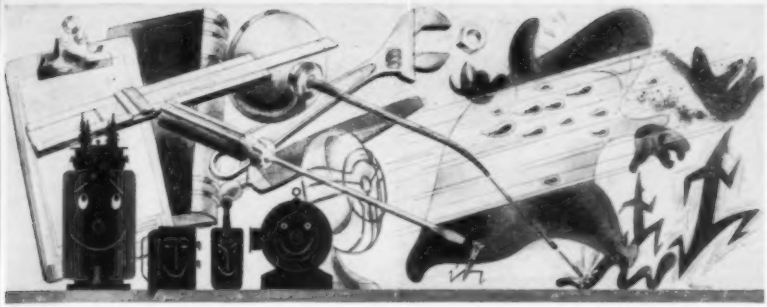
Use capacitors or voltage regulators. Capacitors are particularly valuable in plants with induction motors. Supplying the necessary reactive current by a capacitor placed right at the motor reduces required line current, yet permits the same horsepower output to be maintained.

Check oil conditions for dielectric strength by spark-gap test, watch for sludging, and maintain the oil level. Low dielectric strength warns of moisture and reduced voltage capacity of the transformer.

Check your dry-type transformers too. All electrical connections should be checked at least once a year for tightness and insulation. Dust and dirt, which can change corona values greatly and thus reduce insulation safety factors, should be removed from windings and other surfaces by vacuum cleaners or compressed air.

4 *As switchgear varies so widely in construction features, how can I set up a preventive-maintenance program for it?*

Regardless of construction, position, or capacity, switchgear maintenance demands frequent inspection, tightening of



bolted contacts, adjusting, cleaning and lubrication, and checking for loading whenever a plant change is made.

Rain-tight, splash-proof, weather-proof enclosures are recommended for locations where equipment or products are washed with water. Dust-tight enclosures are recommended for dusty or contaminated conditions.

In switch inspection, include these points in preventive maintenance: cleaning, tightening, dressing contacts, checking pressure and alignment of switch blades, checking overheating in fuses and lubricating operating parts.

5. *What control devices should be given periodic inspection and how?*

These controls should be inspected periodically: magnet-operated, thermally-operated, motor-operated or mechanically-operated devices; static accessories; and equipment such as arc chutes.

Controls should be (1) tight, (2) clean, (3) dry, (4) free from oxidation, (5) free from roughness of contacts, (6) free-moving, (7) adjusted for firmness of contact pressure, (8) inspected for frayed shunts, (9) operated at rated voltage, and (10) kept below critical temperature limits.

6. *Last but certainly not least, what care should I take of motors?*

Remember that dirt, moisture, friction, and vibration cause 90% of all motor failures. The other 10%—oil in wrong places, uneven wear, misalignment, and improper loading.

Keep motors clean and dry. Use enclosed motors where possible. Open motors, besides being wiped, should be blown out with compressed air or cleaned by vacuum. Standby units should be run every few days to prevent condensation.

Proper oiling and greasing, according to the manufacturers' recommendations, retards friction and keeps the oil where it belongs. To prevent vibration, motor alignment should be checked frequently, bolts kept tight, and motor kept balanced.

Overload relays and fuses are cheap protection. Underloading is not as serious as overloading, but it pulls the power factor down, so avoid that too.—Elec C&M, Apr, p51

Coming in This Issue . . .

. . . is a letter to a McGraw-Hill Digest reader (p 31). We believe that its message is so important to every reader that we are reprinting it in the magazine. It tells how to use the McG-H Digest, how to get the most volue from it, how to pick up ideas from outside of your own particular field, and how to save time doing it. We recommend that you read this letter and follow its suggestions to get your full value.—The Editors

New AGCA Landing System Handles Six Planes at Once

Automatic ground control approach, a new landing approach system, is capable of handling six planes simultaneously. It overcomes a major obstacle in the path of jet-transport development. Successful tests at Los Angeles' Ontario airport brought down planes to within 50 ft. of touchdown point by autopilot controlled system's signals. At 50-ft. point, pilot took over.

Basically, AGCA is a new circuit system added to conventional GCA equipment (see McG-H Digest, Mar '47, p13; Apr '47, p9). The circuits, from radar signals received on the ground, measure distance of plane from touchdown and its position right or left of course and up and down from glide angle.

AGCA eliminates human control error factor both in the air and on the ground. The system combines the three present landing systems into one. Airborne equipment weighs only 7 lb. and operates on a single frequency.—Aviation Wk, Apr 3, p16

Large Cores Machine-Molded

Large dry-sand cores at the Westinghouse Trafford foundry are made on a regular jolt-squeeze rollover draw molding machine. Cores range in weight from 50–350 lb.

Core costs have been reduced on those jobs where quantity did not justify the expense of blow boxes. Also, core quality and uniformity improved. No rapping is needed, and a solid core is obtained.

The machine is an SPO Inc. unit with a 9-in. dia. jolt piston, jolt capacity of 1,200 lb., 21-in. dia. squeeze piston, and squeeze force of 24,000 lb. at 80-psi. line pressure. Draw stroke is 12 in.

Small core boxes are mounted in multiple units on the pattern or corebox cradle. Large boxes are mounted singly. Spaces between individual boxes are filled in to give a continuous surface. This prevents excessive sand spillage between boxes, helps placing the sand in boxes, insures good contact of core plate, and acts as bearing surface for strike-off.

Machine operation is conventional—filling with sand, jolting, squeezing, strike-off, venting, roll-over, and drawing.—Foundry, April, p146

New French Synthetic Fiber From Polyvinyl-Chloride

A pure unplasticized polyvinyl-choride polymer film that is 100% non-flammable, will not melt, dissolve in acid or alkaline solutions, or conduct heat or moisture is in commercial production by Societe Royal, Tronville-en-Barrois, Meuse, France. Four forms have been developed—Rhovyl, Fibrovyl, Thermovyl, and Isovyl.

Fiber is extruded in filament form into volatile solvent and then into hot air. Spinning speeds are higher than those possible with wet spinning. Process consists of taking advantage of the action of carbon sulphide on polymers of vinyl chloride. Carbon sulphide does not dissolve vinyl chloride, but allows it to be dissolved by other non-solvent materials in a still secret process.

Fiber is neither a plasticized strand nor a product of copolymerization. It can be produced in sizes as fine as 3 denier.—Textile World, Apr, p120

New Hot-Rolling Mill

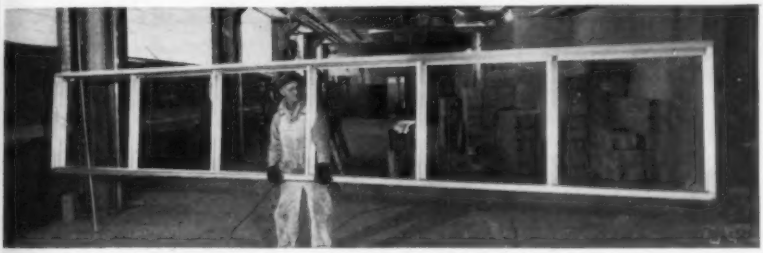
Steel before long may be hot-rolled cheaper and faster. A single-stand Sendzimir mill now being tested can reduce ¾-in. material to 0.03 in. in one pass. Reduction is effected by numerous 1¼-in. dia. rolls positioned parallel to and around the face of a pair of 8-in. rolls. Work is fed in by pinch rolls and, during rolling, is always in contact with two or more of the small rolls.—Steel, Mar 6, p56

BEFORE FACE-LIFTING, the former Ford Motor Car Co. assembly plant did not look much like a sales office.

AFTER FACE-LIFTING it is a light, quiet, efficient office. It serves also as a good salesman for aluminum.

Plant Renewed With Aluminum

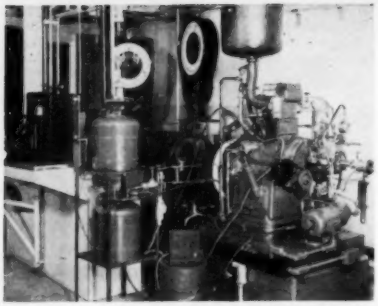
To remodel a former assembly plant, Reynolds Metal Co. used aluminum throughout to convert the plant into a sales office. Remodeling cost $500,000. Perforated, corrugated aluminum ceiling deadens office noises.—Business Wk, Mar 25, p99

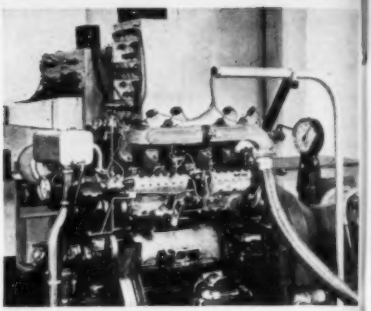


REYNOLDS DESIGNED these six-vent aluminum window frames. They are 30 ft. long, weigh 113 lb. each. Office area makes full use of natural light.

DUCTS carrying fresh air and heat hang between old and new ceiling.

DROP CEILING is perforated sheet. Holes both deaden noise, circulate air.





SOON TO BE POPULAR—KNOCKLESS ENGINES

Automobile engines that will burn any fuel without knocking may be just over the horizon if further developments bear out Texas Co.'s experiments. Engine is based on new design principle. An air swirl in the cylinder keeps fuel from firing at wrong time. Single-cylinder model has given knockless performance under widely varying conditions.—Oil & Gas J, Mar 2, p21

Predetonation is eliminated in this high-speed, 6-cyl. diesel engine built by Shell Petroleum Co., Ltd., England. It has "pilot injection" fuel system. A small injection of fuel is ignited in the cylinder to form a torch to fire the main charge, thereby producing a smooth explosion. New engines now under construction will soon be given road tests.—Oil & Gas J, Mar 9, p51

High-Angle Steel Tools Give Results Near Carbide

Metalworking companies have been experimenting in the U. S. with high-angle milling with high-speed-steel cutters. By high-angle milling is meant rake angles considerably in excess of usual angles—as high as 30° positive radial rake.

Jones & Lamson Machine Co. has developed several such cutters. One is a 3¼-in. dia. 10-tooth plain milling cutter with 30° radial rake and 35° helix.

The cutter is used to machine SAE 1020 with ¼-in. cut depth and 1¾-in. width. Cutter speed is 500 rpm.; feed is 60 ipm.; chip load is 0.012 in. per tooth.

Complete cycle time (floor to floor) compared with conventional milling is: high-angle slab milling—3.7 standard minutes; conventional slab milling—8.9 standard minutes; milling with 4-tooth, 4-in. carbide face mill—5.30 standard minutes.

High angles also were successful on slotting and form milling. On turning, results were poor because of inability to keep cutting edges sharp enough. The higher angles work with some success on cutting-off tools where surface speed reduces rapidly and coolant is confined to an extent in the slot formed by the tool. —Am Mach, Apr 3, p122

Why Glutamate Works

Monsodium glutamate, it long has been known, improves the flavor of food. Research by International Minerals & Chemical Corp. now reveals why. Sixteen varieties of canned vegetables and six of fresh were analyzed and found to contain glutamic acid. The fresher the vegetable, the more acid it contained. Cooked vegetables stored in a refrigerator keep most of their acid. Stored fresh vegetables lose from 25–35%. Adding glutamate restores partially the fresh, young taste.—Food Ind, Apr, p7

Titanium Enamel and Steel Cut Range-Production Cost

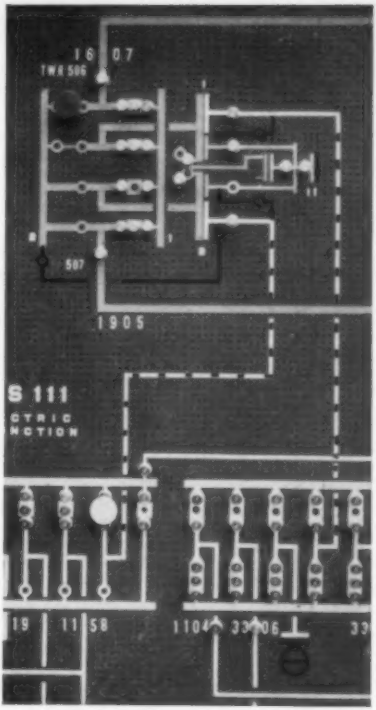
Production costs dropped, chipping reduced, color improved, shipping costs shrank when Westinghouse Electric Corp. started production of electric ranges using titanium steel and titanium enamel. Even in the face of rising labor and material costs, they have cut costs per sq. ft. to the 1941 level.

Westinghouse tried Inland Steel Co.'s Tri-enamel, a titanium-bearing steel. It was developed for one-coat enameling processing. The titanium acts as a stabilizer, keeping impurities from "boiling out" and thus eliminating the ground coat.

Benefits of the titanium process have been:

1. Steels resist sag, simplifying bracing and finishing.
2. Thinner coats—down to 0.006 in.—are possible.
3. Ground coat and processing are eliminated.
4. Sharp corners are possible.
5. Titanium coating is more resistant than previous coats to acid; more resistant to scratching.

Packing costs have been cut 50%. Although first cost is higher, over-all savings are great.—Business Wk, Apr 15, p52



SIMPLE OPERATING DIAGRAM

Maintenance of accurate operating diagram is made easier with this type of board. It is 1/8-in. green linoleum perforated with 1/16-in. holes on 7/32-in. centers and mounted on 3/4-in. plywood frame. Cellulose tapes of different colors designate transmission lines of different voltages. Metal pins representing switches and circuit breakers are inserted in holes. Changes in the system are easily made.—Elec World, Feb 27, p96

Air Gun Aids Arc Cuts

Faster cutting out of faulty welds in stainless steel at Portsmouth Naval Shipyard was made possible by combining an air pistol with an electrode holder. Arc cutting is speeded up by a blast of compressed air.

Valve mechanism of pistol is clamped on the electrode holder. A short flexible hose leads from valve to the hollow tube forming the nozzle. The operator can hold both pistol and holder in one hand and direct the air jet into the arc.

Besides cutting faster, the device leaves no carbon deposits, makes arc easier to control, causes no pitting, removes least amount of weld metal of any method tried, and lessens probability of quench cracks.—Weld Eng, Apr, p54

How To Test Hard Materials

Two recently developed hardness testers facilitate testing of extremely hard materials. One finds hardness tensors, the other hardness vectors

TESTING OF DIAMOND, sintered carbide, silicon carbide, and other hard materials is now an easier job. The reason: two British machines, one a static indentation hardness tester and the other a micro-abrasion tester. They owe their development to the impossibility of testing diamond, usually considered as the hardest material, by conventional methods.

The indentation tester has a double-cone diamond indenter. Its circular diamond edge can be swivelled about its center so the entire periphery can be used. When any part of the periphery is damaged, another undamaged part is brought into operation.

In 2 years of testing, no chipping of the extremely sharp edge has been observed, although tests were made on sintered carbide, silicon carbide, boron carbide, synthetic corundum, and sintered alumina. The tester is not suitable for testing diamond itself.

The double-cone indenter can be fitted to all types of hardness testers and micro-hardness testers with a higher limit of 2-kg. load. Also, a new hydraulic Macro-Micro tester has been developed especially for this type indenter.

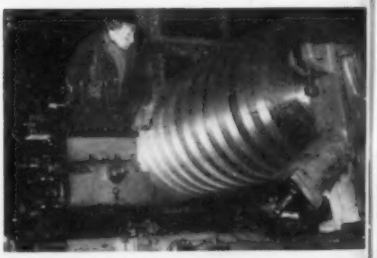
The indenter is pressed into the material perpendicular to the cone axis to form a boat-shaped impression. With the Macro-Micro tester, the length of the indentation is measured by a microscope mounted at 45° to the test surface. The actual measurement is made with an eyepiece screw micrometer. Double-cone hardness is found by dividing load in kg. by length in mm. cubed times indenter constant.

Failure of the indentation test on diamond led to design of a small micro-abrasion tester. This tester has a 1-in. dia. wheel rotating at 10,000 rpm. or more. For diamond or sintered carbide, the wheel is made of cast iron shaped to 110° included edge angle and smeared with fine diamond dust in olive oil.

The test specimen is usually held in a plastic block 26 mm. in dia. and 1⅛ in. high and mounted at one end of a counterbalanced arm. The other end of the arm carries an adjustable loading table.

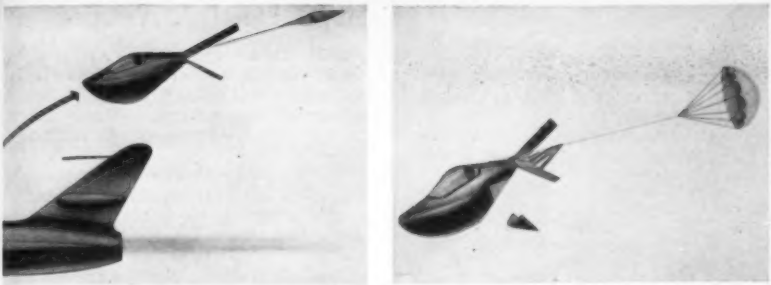
The wheel is driven by a ⅓₀-hp. motor that is mounted as a pendulum so it can oscillate within limits around the rotating shaft. The motor is co-axial with the grinding-wheel spindle.

The micro-abrasion tester has been found useful for investigations other than testing hardness of extremely hard materials. It can be applied to testing the abrasive power of special or standard grinding wheels against a standard material, to finding differences in physical properties with orientation, and to testing properties of abrasives, polishing materials, and lubricants.—Mach, Mar 25, p397



GAS TURBINE MAY BURN PEAT

Low-pressure turbine rotor is being machined at Messrs. John Brown, Ltd., for the gas turbine that is expected to be the first in normal power-plant service in Great Britain. Plant, rated at 12,500 kw., is of closed-cycle design. Unit will burn fuel oil at first, then pulverized coal and peat later.—Power, Mar, p138



BREAKAWAY COCKPIT PASSES PRELIMINARY TESTS

Preliminary tests of this breakaway cockpit by U. S. Navy Bureau of Aeronautics indicate the principle is sound; flight tests will be made. Designed for pilot escape from high-altitude, supersonic aircraft, cockpit capsule is pressurized, insulated, and will float. Pilot pulls lever and capsule is blown free. Three stabilizers prevent tumbling and parachute eases descent.—Aviation Wk, Apr 3, p28

Instant Quality Control Reduces Manufacturing Costs

Highest possible quality of many mass-produced parts and reduced manufacturing costs will come from an electric computor announced by General Electric Co. It is called a "quality-control indicator."

The device keeps an automatic, continuous check on reject rates and makes possible the locations and remedy of abnormal production troubles as quickly as they occur.

Statistical analysis of production and rejection rates in the past has meant time-consuming computations, lagging behind production by hours. The new instrument avoids the lag.

It counts the number of items produced as they pass photoelectric cells or trip devices located along conveyor lines. Whenever a part is rejected, the inspector presses one of several pushbuttons. Each button is labeled with the name of a defect for which inspectors test.

Both signals are registered on a quality meter, indicating at the moment whether reject percentage is above or below an acceptible level determined by previous production experience.

In one trial installation, the reject rate was cut more than 60%. On a compressor assembly line, the rate dropped from 2.7% for a check on five characteristics to 0.89% in 6 months.

The indicator will find use wherever continuous inspection and testing are required. Typical industries are automobile, appliance, electronic equipment, and others in mass production.—Steel, Mar 13, p99

Recover Manganese from Slag

Under licensing agreement from Sylvester & Co., Ohio Manganese Co., Inc., is recovering manganese from open-hearth furnace slag. Processing about 250 tons of slag per day, 94% of the manganese and iron present is recovered. Manganese content must run at least 4% for the process to be profitable. Cost of producing the concentrate is $4–5.50 per ton of slag. With electric furnaces, the cost will run $8–12 per ton of slag.—Business Wk, Apr 15, p56

Convention Calendar

(Equipment Exhibited)

June 15-19—Industrial Finishing Exposition, Chicago, Ill.
June 26-30—American Society for Testing Materials Annual Meeting and Exposition, Atlantic City, N. J.
Aug. 7-19—First United States International Trade Fair, Chicago, Ill.
Aug. 14-18—National Power Show of National Association of Power Engineers, St. Louis, Mo.
Sept. 5-9—National Chemical Exposition, Chicago, Ill.
Sept. 11-15—Instrument Society of America Conference and Exhibit, Buffalo, N. Y.
Sept. 25-27—National Electronics Conference, Chicago, Ill.
Oct. 2-6—National Hardware Show, New York, N. Y.
Oct. 23-27—American Society for Metals National Metal Congress and Exposition, Chicago, Ill.
Oct. 23-27—National Business Show, New York, N. Y.
Nov. 27-Dec. 2—Exposition of Power & Mechanical Engineering, New York, N. Y.

To anyone interested in any of these exhibitions, either as a possible exhibitor or visitor, the McGraw-Hill Digest will be glad to furnish additional information.

Interlocking Shipping Boxes

Latest advancement in shipping containers is a new interlocking carton that cannot slip when tiered on pallets. Steel banding is unnecessary. One manufacturer reports lack of breakage during shipment and warehousing more than offsets the 15% extra cost.

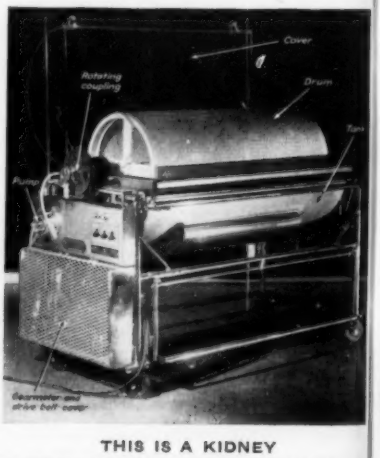
Locking is achieved in construction of carton. Side walls are arranged so that each container has a recessed bottom and top extends above shoulder of the side walls. Thus top of one container fits into the recessed bottom of the container above.—Mod Packaging, Mar, p96

Novel Plastic Developed

Plastic Laboratories at Princeton University has announced a new series of polyurethane plastics that will find many industrial applications. Chief use so far is as potting compounds for transformers.

The plastics vary from soft rubbery to extremely hard materials. They exhibit good elastomeric, electrical, and physical properties. They are good shock dampeners.

The polyurethane plastics are made by reacting castor oil with tolylene diisocyanates. The castor oil, basically a trihydroxyl alcohol, forms cross linkages with diisocyanate, making the material thermosetting. Di-tertiary butoxy diamino silane is added as a catalyst.—Chem Eng, Apr, p165



THIS IS A KIDNEY

Mechanical kidney made by Allis-Chalmers Mfg. Co. consists of rotating drum spirally wound with plastic tubing. Both are partially submerged in liquid bath. Blood pumped through machine is purified by passage of poison molecules through tubing walls. Action of the spiral pumps the blood through tubing.—Prod Eng, Mar, p102

Mr. U. Saw Tun
Deputy Director of Industries
Government of the Union of Burma
Secretariat, Rangoon
Burma

Here is a letter from our files. I believe you will find it helpful.

Dear Mr. Saw Tun:

Of course, we shall send you the original article from which the Digest story was abstracted. That is one of our services to you as a subscriber.

Tell me, have you ever wondered whether you were getting full benefits from the Digest? Have you ever asked yourself how the Digest could better serve you in your work? Here are some ideas that may help:

- First of all, read the table of contents -- always on page 3. But remember that this list is not complete. Every month we bring you more than 150 items digested from 54 different magazines and backed up by nearly 450 full-time editors, nearly 500 part-time correspondents, and more than 65 correspondents outside the United States.

- Your Digest, as a management magazine, keeps you informed on important economic developments. Read Business Trends, Washington Report, and the business-type articles directed to you each month.

- Your Digest brings you technical articles spread over a large number of different industries. Here you can get ideas -- how improved methods and processes in one industry can be applied directly or modified to other industries. Read the articles in your own field first, but don't miss the other articles.

- Ask us for the complete original article whenever you are particularly interested in a Digest article. It will be sent at no extra cost to you. Some subscribers ask for as many as ten each month. You can help us handle your request faster by quoting title of article, page and month it was published, and the source information at the end of the article -- for example, "New Fatty-Acid Product Plant", p42, April Digest ... Chem Eng, Feb, p124.

- Ask us for more information on new products. We shall be glad to send you the original article. We shall also ask the manufacturer to send you additional information.

- Ask us for manufacturers' catalogs. Just fill out and send the coupon included in the "Production Ideas from Manufacturers' Catalogs" department. These catalogs tell you not only what the manufacturers offer for sale, but also contain valuable engineering data.

- Read the advertisements. They offer you the tools of efficient management. Write directly to the advertisers for more information -- or send your letter to us.

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- And for maximum use of the Digest, keep your back issues. They will serve you as a valuable file to which you will refer again and again.

Very truly yours,

Harry S. Wharen

Harry S. Wharen, Editor

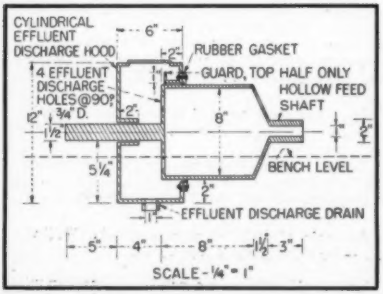
Can Paternalism Be Good?

Stanley Home Products, Inc., believes paternalism can be good. Their labor-relations program is based on a sound foundation of paternalism

IS THERE SUCH A THING in labor relation as *good* paternalism on the part of management? Stanley Home Products, Inc., believes there is. Furthermore, the executives believe they have a workable policy of paternalism in operation within their household-equipment plant.

Stanley has grown from seven employees in 1931 to 800 today, 600 of them being production workers. The company does not believe it works on a formula basis for its labor relations, but to an outsider a definite formula is evident.

First is the foundation . . . good working conditions, wage policies, and employee benefits. Then comes the superstructure . . . based on what the employees want, not what management thinks they want.



BATCH-TEST CENTRIFUGE

Needing a laboratory centrifuge that would produce the same result as a Bird centrifugal deslimer in the mill, National Lead Co. designed and built this unit. Strictly a batch machine, it gets effective separation quickly of minus 5 and 10 micron materials in undispersed pulp. Complete separation at a given size depends on number of times sample passes through machine. Three cylinder speeds are possible.—1,000, 1,700, and 2,600 rpm.—Engrg & Min J, Apr, p79

No one gets all they want, so Stanley gives readily on the smaller issues, acts more slowly on the larger issues.

That Stanley has low labor turnover, hence new employees are not being trained continuously, that Stanley attracts high-caliber employees (6,000 applicants on the waiting list) attest to the solidity of their employee-relation program's foundation. Three factors for the foundation of the program are:

1. Working conditions are good. Plant is clean, well lighted, well ventilated. Cafeteria is available, offering a varied menu. An inplant medical service is maintained with a nurse in attendance at all times. Workers are given two 10-min. rest periods daily, free doughnuts and coffee being available during the morning period.

2. Wage policies are good. Average rates are the highest in the community. There are non-guaranteed bonuses. A quarterly wage dividend of 5%, a half-year profit-sharing plan, and a Christmas bonus are provided.

Wage increases within rate ranges are on merit. Three merit-rating plans parallel the job-evaluation plans. All employees are rated twice a year.

3. Employee benefits are good. Biggest item in employee benefit plan is a non-contributory profit-sharing pension plan. After 3 years, an employee is eligible. Before taxes, 7% of the net profit is put into the fund. Employee's share is based on a point system—one point for each year of service and one for each $100 of annual wage. Cash withdrawals are not allowed.

Group insurance includes life, hospitalization, surgical, weekly sickness, and accident insurance. Contributions are $0.50–0.70 per week per employee.

Handling of employee grievances at

Stanley is interesting. The effective system is based on the Stanley Council.

Take an employee working on incentive (28% of the workers are on incentives) who is paid his vacation pay on his base rate. This, he thinks, is unfair. He believes his vacation pay should be figured on his average earned rates.

After talking his idea over with other incentive employees, he talks to his Stanley Council representative who carries the grievance to the foreman. Since the foreman feels the question is beyond his managerial responsibility, the question must be taken up at the weekly Council meeting. Both the employee and management representatives are present to state their case. The Council, believing the plan has merit, sends the employee to see the plant manager.

Because the plant manager believes the plan works a hardship on nonincentive workers, he vetoes the idea. Back to the Council goes the idea and the plant manager's veto.

Final step is to refer the grievance to the company's president. His decision is final. In the 3 years the grievance procedure has been in force, only two cases have been carried to the president.—Factory, Apr, p52

Fluorescent Street Lights Still Under Development

Experimental fluorescent street lighting installations in Detroit, Cleveland, and Schenectady have been studied for the past 8 years. The studies showed that:

1. Advantages include long life, low brightness, high efficiency of light generation, and good visibility on wet streets.

2. Disadvantages include low output per foot of source, large size of luminaires, and the need for jacketing in cold weather to assist in maintaining light output.

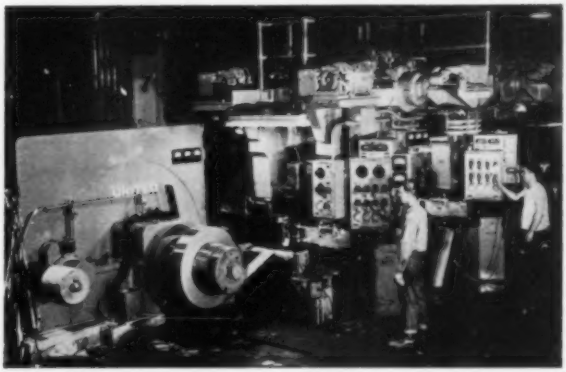
3. Fluorescent lamps are likely to find their earliest use in tunnels, underpasses, and other locations where structural features allow their ready mounting.

Economically, fluorescent lighting cannot be justified; it costs more for fixtures, lamps, poles, brackets, and maintenance than does incandescent lighting of the same lumen output.

But when more is known of visibility and how to evaluate it, economy of fluorescents may be compared with that of incandescents with more favorable results for fluorescent.—Elec World, Mar 13, p79

40% REDUCTION IN ONE PASS

New two-stand, four-high tandem mill at Wallingford Steel Co. reduces strip gage by 40% in single pass in breakdown of stainless and carbon steels. Built by United Engrg. & Foundry Co., mill can handle 18-in. stainless and 22-in. carbon strip from 0.16-0.010 in. at speeds up to 800 fpm.—Steel, Mar 20, p51



General Design Precautions for Projection Welding

Projection welding, like other forms of resistance welding, can be overly designed or overly specified. Only necessary welds should be specified.

Three properly proportioned projections spaced at proper intervals will make a stronger weld than six projections of incorrect proportions. Also, the fewer the projections the easier it is to equalize pressure and current.

These five basic principles cover general limitations, precautions, rules:

1. Projection should be rigid enough to support electrode pressure. If it is too large in diameter or too weak in proportion to piece thickness, insufficient heat will be formed.

2. Projection should have enough mass to heat the opposing surface to correct welding temperature.

3. After welding, the surfaces should be in intimate contact with no metal expulsion or weld-area separation. One way to prevent this is to provide relief around the projection.

4. Projection must not be partially sheared or deformed during forming, except in special cases as in welding extremely thin parts such as tubing.

5. Projection welds should cause little if any part distortion during either forming of projections or welding.—Prod Eng, Apr, p113

European Screen-Printer

Semi-automatic screen-printing machine, developed by Teximpex, Sweden, allows one man to do hand-printing work. All movements are automatic. Printing is done wet-on-wet without slipping because of exact registry of stencils. Once register is set, it will remain through the entire run.

Blotches, stripes, and fine lines of any length are possible without bleeding, splits, or smears. Printing is by endless rubber blanket which is washed as it passes under machine. Screens are positioned hydraulically. Squeegeing is by hand.

Designs up to 59x59 in. are possible. After printing, cloth is dried in dry box at rear. Machine is suited for printing vat colors. Capacity is 16 screens.—Textile World, Mar, p142

Recording with Ultrasonics

Permanent record on paper can be made without touching the paper's surface by using a special sono chromo tropic paper. The paper is chemically treated so portions of its surface when subjected to high-intensity ultrasonic energy undergo a visible change.

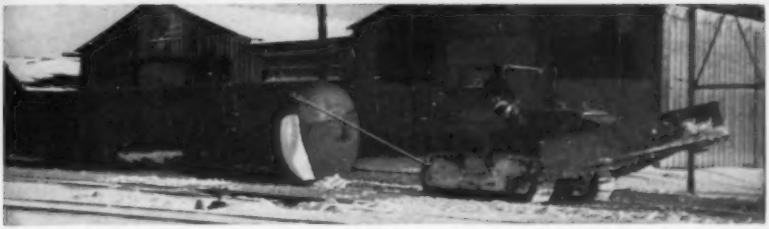
Thus a modulated source of ultrasonic energy can inscribe information on such paper for a permanent record. Energy concentration is needed. So a generator that is capable of pin-pointing 2 watts of ultrasonic energy was developed at State College of Washington under Office of Naval Research sponsorship.

The recorder point is the end of he vibrating element of a magneto-striction oscillator. The element, a thin-wall nickel-alloy tube ⅛ in. in dia., is driven by an 805 triode at 20 kc. The electrical also contains a plate coil and grid coil.—Electronics, Apr, p84

New Soybean-Oil Extractor

First large-scale application of the Blaw-Knox Rotocel solvent extractor begins with opening of Glidden Co.'s new soybean processing plant.

The Rotocel operates in the horizontal plane with the flake-holding baskets on a revolving rotor, whereas the conventional extractor has its process flow in the vertical plane. Among advantages reported are savings in building height, presence of counter-current flow of solvent throughout cycle, and more complete extraction of oil.—Food Ind, Apr, p134



TO MOVE four gas storage tanks—each weighing 40 tons, 8 ft. in dia., 70 ft. long—Austin Co. waited for snow. Coefficient of sliding friction was reduced from 0.2 for dry ground to 0.02 for snow. A D-8 Caterpillar tractor in front and a Lorain motor crane behind were the motive power at Dow Chemical Co.'s Midland plant.—Cons Meth & Equip, Apr, p52

Heavy Hauling Simply Solved

WEIGHING 90 tons and covering 152 ft. of road, this 40-yd. stripping shovel and 80-ft. stick were moved by Crane & Truck Service Inc. A bolster was welded to bucket bottom and was fastened to trailer by a 3-in. pin. Trailer bed was reinforced by 80-lb. rail and ⅞-in. steel plate. The tractor was a 200-hp. diesel unit. A pole trailer was steered and pushed by a second tractor.

WITHOUT dismantling this 610-ton walking dragline, the 220-ton machinery deck was moved 60 mi. on a double trailer and dolly rig. Two D-8 Caterpillar tractors pulled the load. Dollies rode on 60 Goodrich tires. Morrison-Knudsen Co. and M. H. Halser were the movers.

REGENERATOR, weighing 105 tons, was floated 5 mi. down the St. Lawrence River, then hauled 3 mi. overland to Shell Oil's refineries. An Autocar diesel tractor moved the load. Generator was steadied by lines to an accompanying bulldozer. Steel plates were used to reinforce weak spots in roadway. Move was by Arthur G. McKee Co.

Adapt 44-Passenger Bus to Use Liquefied Petroleum Gas

To lower operating costs through lower fuel bills, Twin Coach Co. and the Chicago Transit Authority have adapted a 44-passenger bus to operate on butane-propane—liquefied petroleum gas. Bus will operate on a regular schedule of daily service during test period. Preliminary figures indicate L.P.G. consumption averages 4 mpg. compared to 3.9 mpg. for gasoline. But figures are not conclusive as yet.

Bus engine operates at a compression ratio of 10 to 1. Spark setting from 5 to 10° before top dead center is permissible and should result in longer spark plug and distributor life.

Additional advantages of L.P.G. are: clean burning without offensive, low CO content, quiet smooth operation, little or no crankcase dilution, no spark knock, reduced cylinder wall wear, 2½¢ per gal. fuel cost at refinery.

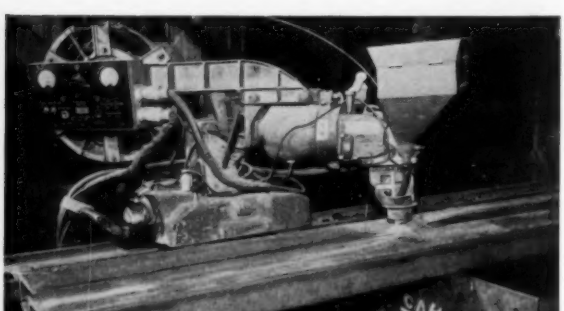
Problems presented by L.P.G. use are: high compression and more efficient engines are necessary; fuel tanks must be rugged enough to withstand street collisions; tanks must be equipped with shutoff valves in case fuel line breaks; special carburetor and fittings cost about $300.—Bus Trans, Mar, p48

Lime Aids Desulphurization

Lime added to blast-furnace hearth slag aids desulphurization. One method of getting the lime into the slag uniformly and economically is through the tuyeres. In a mechanized system developed for this purpose, lime crushed to pass through a No. 20 mesh goes by screw conveyor from a storage hopper to a 2-in. pipe to each tuyere. Each pipe has its own blower. Air needed to inject the lime is about 5% of the total furnace air.—Steel, Mar 20, p109

Don't Forget the Dust

Good-sized metalworking firm recently installed a conveyorized painting setup that works well and makes the savings that management hoped it would. But nobody thought of the loose dust in the plant, so no provision was made for dust catchers or exhaust fans. Now there is trouble with dust on finished parts.—Am Mach, Apr 3, p173



MAKES BOX BEAMS

Dominion Bridge Co., Canada, makes box beams quickly and cheaply by submerged-melt welding. Here 16-ft. dipper sticks are built up by joining 12x6x⅝-in. angles. Long leg of each is beveled 30° to produce vee for corner weld. Angles are tacked manually, then machine-welded in three passes at each seam.—Weld Eng, Apr, p35

Thinking About a New Plant

TYPE OF PLANT	AREA IN SQ. FT.	TOTAL COST	ANNUAL COST	ANNUAL PAYROLL	PERCENTAGE OF PAYROLL
Electric Products	200,000	$1,400,000	$ 95,000	$6,300,000	1.5
Machinery	38,400	340,000	30,200	880,000	3.4
Machine Shop	390,000	2,450,000	165,000	3,430,000	4.8
Tools	500,000	4,500,000	263,000	5,200,000	5.1
Candy	52,000	365,000	31,700	505,000	6.3
Textiles	64,000	770,000	53,500	780,000	6.9
Truck Terminal	44,700	257,000	22,600	290,000	7.8
				Average	5.1

New Plant for Only 5% of Payroll

Your new plant may cost you much less than you have expected to pay. Good planning can make the plant a real production tool

IF YOUR COMPANY IS GROWING and you think it will continue to grow, you will soon need a new plant. If you think it will cost too much, look closely at the table above.

Think of your building costs in relation to total cost of production. If the cost of your new plant will be a smaller part of total production cost and save an even greater sum, in effect the plant will make you a profit.

A new plant will probably cost much less than you think. Walter Kidde Constructors, Inc. believe you can get your plant for an annual cost of 5% of your yearly total payroll. The 5% is average. The 5% will give you a plain but substantial plant—fancy trimmings will cost you more.

Plant costs include land, engineering, and construction. Plant costs do not include production machinery or equipment. Heating, lighting, plumbing, and sprinkler system costs are included.

From the table you see that annual costs bear no fixed relationship to total plant costs. This is because mortgage or lease terms are never the same. In each case annual cost shown is enough to amortize the whole cost.

Remember, sale of your old plant will reduce the cost of the new plant. The table is not adjusted for sale of the old plant.

Annual square foot cost depends upon (1) original costs, (2) term of mortgage or lease and, (3) interest charges.

Original costs—Site cost, degree of finish inside and out, and size effect original cost. Land costs usually run between 3–10% of the total costs. In cities cost may run 20%.

Degree of finish—Amount of interior finish is probably the greatest single cost factor. Simple structures, such as warehouses, cost as little as $4–5 per sq. ft. Simple manufacturing plants may run $6–9 and more elaborate plans, such as laboratories requiring special equipment, often cost $20 per sq. ft.

Size of plant—Size of the plant has a marked effect on sq. ft. costs. This is due to the distribution of fixed charges over a large number of units. A plant of 36,000 sq. ft. may cost 25% more per sq. ft. than a similar plant of 100,000 sq. ft.—Factory, April, Part II

Please turn page for four examples of how new plants paid off. ➡

Thinking About a New Plant

Do New Plants Pay Off? . . .

The Hallicrafters Co. said . . . *"Handling costs are down 35% in the new plant"*

SINCE OCCUPYING their new Chicago plant in 1947, Hallicrafters Co. has cut materials handling costs 35%. And the reduction takes into account adjustments in dollar values then and now. Straight-line production has been found to be well suited to quick changeover from one model to another.

More important, the layout in the new plant was so flexible that when the company changed to television manufacture the changeover could be made simply.

Space permitted longer production lines and supervision with 50% less supervisors. Overall production efficiency has been raised 25%—more adequate facilities, better location, improved production techniques all contributing.

Capacity is up 50%. Overall heating and lighting costs are up slightly but cost per sq. ft. for these services is lower. Insurance charges, building maintenance, and unit lighting costs are down.

The plant cost nearly a million dollars and will pay for itself in 15 years according to company officials.

A. G. Spalding & Bros., Inc. said . . . *"Our operating costs are now 8–10% less."*

ECONOMIES BROUGHT ABOUT by the company's 1948 plant are conservatively at least $200,000 a year . . . probably more. Materials handling costs are down 20%. Plant maintenance costs are down 15%. A cut of 5% has been made in inventory costs. Insurance costs are down 10%.

Lighting costs are about the same as in the older plant but the lighting in the new plant is much better. In the manufacturing area fluorescent units give 40 foot-candles at work level.

Shipping costs are down 15%. By building the new plant Spalding has consolidated operations of four plants into one. Even with consolidation there is 20% more capacity than before.

New methods and processes are in use that could not have been possible before the new plant was built.

Not anticipated before the plant was built are certain bonuses, including better supervision, closer management control, tighter integration of operations. These represent a saving of 8–10% in total operating costs.

Many U. S. Business Men Are

. . . Four Companies Say "Yes"

Bell & Howell Co. said . . .
"Work-in-process inventory has been cut 21%"

SINCE COMPLETION of its new Chicago plant the company has been saving $400,000 per year. At this rate the new plant will pay for itself in 10–15 years.

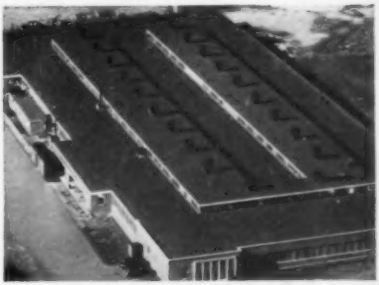
Five different assembly departments were consolidated into one. This requires only 34% of the total space used before—15,000 sq. ft.

Outstanding saving was in assembly-work-in-process inventory—reduced 21%. On assembly lines for cameras and projectors time cycle has been cut 50%. Part of the saving came from better methods and more efficient positioning of tools and parts.

Building occupancy costs are 15% less per sq. ft. in the new plant, including heat, light, maintenance, etc.

The new plant is air conditioned, permitting certain lens-making operations impossible in the old plant. Plant is safer. Over ¾-million man-hours have been worked without a lost-time accident.

Processing time on parts has been cut 45%. Direct-labor man-hours have been cut on some operations up to 40%.



Bush Manufacturing Co. said . . . *"Maintenance costs have been cut 40%"*

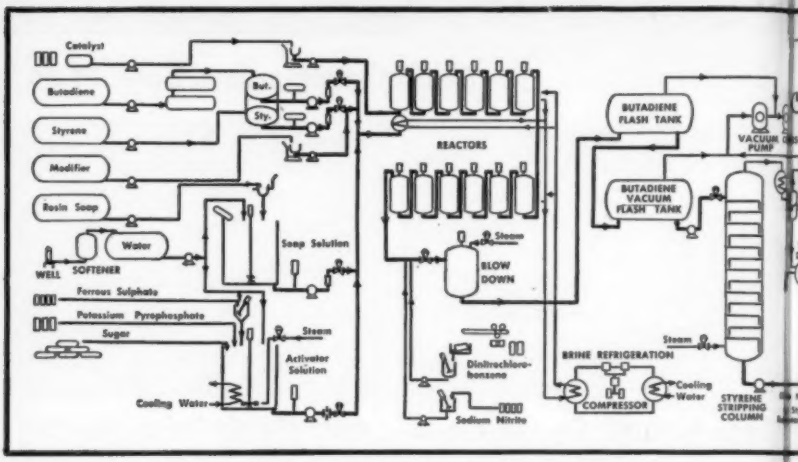
THE WEST HARTFORD, Conn., plant has saved $50,000 per year since it was built in 1947. Annual cost of carrying the new plant is only 6¾% of total annual payroll. The plant will pay for itself in 20 years.

Maintenance costs have dropped 40%. Many changes in maintenance procedures have been made. Major change was to 3-phase power supply. This eliminated need for stocking motor controls for specially built 2-phase equipment.

Piping is color-coded. Air and water lines are threaded. Gas lines have welded joints. Inventory of maintenance parts has been reduced and a more efficient system for emergency repairs has been developed.

Wider aisles are well marked. Departments have been located to minimize trucking. Materials handling costs have thus been cut 25%.

Heating costs have been cut 30%, shipping costs 25%, lighting bills 10%, insurance 10%. Supervision is better and costs 25% less.



CONTINUOUS POLYMERIZATION OF COLD RUBBER

Houston plant of Goodyear Tire & Rubber Co. has converted from continuous polymerization at 122° F. to 41° F. Capacity is 15,000 long tons of "cold" GR-S per year. Butadeine and styrene from tank, soap solution from mixing tank, and activator solution are pumped to charge header. Mixture passes to reactors. Each reactor is 3,750-gal.

Six-Tenths Factor Applies to Complete Plant Costs

Common problem in plant estimating is to figure what a new plant will cost at two or more different levels of design capacity. The smallest economic production volume can thus be gaged, and the effect of increased capacity quickly determined. Some valuable general principles can be observed:

1. Change in design capacity influences number, sizes and types of process equipment desired, but not necessarily in proportion to the capacity change.

2. Costs of individual items vary as the 0.6 power of the capacity ratios, over a broad middle range of sizes.

3. Costs of related facilities decrease in proportion to total equipment cost as design capacity increases.

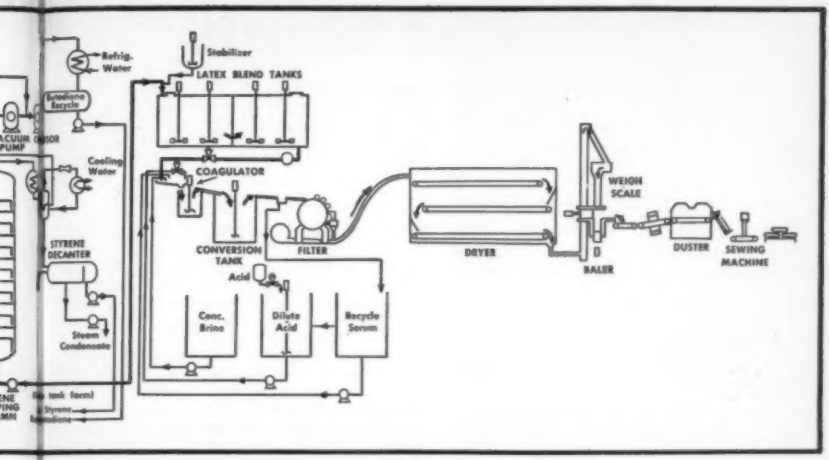
4. Practical considerations limit sizes of individual pieces of equipment as well as sizes of complete plants.

Furthermore, costs of complete process plants seem to follow the "six-tenths" rule. Thus, for most chemical plants, if the size of the plant is doubled, it will cost $2^{0.6}$ times as much.—Chem Eng, Apr, p113

New Alloys for Jet Engines

Three new alloys for jet engine parts—Discaloy, Refractaloy, and K42B—have been developed by Westinghouse Electric Corp. Still in laboratory production stage, the alloys meet the exacting physical and chemical properties necessary for jet-engine operation.

Discaloy will be used for rotor blades, Refractaloy in blade molds, K42B for all engine bolts.—Business Wk, Mar 25, p76



glass-lined vessel, agitated and jacketed. Brine from refrigeration unit holds reactors at 41° F. Total holdup time is 17½ hr. Conversion percentage is 60%. Unreacted styrene is recovered in stripping column, butadiene in flash tanks. Latex is blended, coagulated with acid brine solution. Coagulated polymer is filtered from slurry. Hammer mill at the filter discharge breaks the cake into crumb, which is dried, baled, dusted, and sewed into packages.—Chem Eng, Apr, p102 and 176

External Light Source Improves C-R. Photographs

Common method of photographing cathode-ray traces for record purposes is to place a hood around the c-r. screen and camera to keep out all external light. Result is the trace against a black background.

But sweeps, calibrations, and test conditions also must be recorded. Time and effort would be saved if this data were recorded on the photograph. This can be done by using an external light source to illuminate the area around the tube face and show it in the picture.

The illuminated area is marked with the data needed. A calibrated screen can be made by welding or soldering fine, shiny wires in a criss-cross pattern in a metal frame. The camera picks up the wires as white calibration lines. A paper mask over the frame carries the data.

Best illumination is given by a 32-watt circular fluorescent lamp mounted in front of the tube screen and close enough to avoid reflections in the picture.

An alternative device is an 8x10-in. ground-glass diffuser lighting the screen at an angle.—Electronics, Mar, p86

Alloy Steel for Chute Liners

Jones & Laughlin Steel Co. is installing Jalloy heat-treated alloy-steel plate on chute bottoms and liners in its coal-preparation plant. The Jalloy liners are expected to save $130,000 in plant operating costs during the life of the steel. It is expected to last 4-10 times as long as mild steel. It has a yield strength of 160,000 psi. and a Brinell hardness of 341-388.—Coal Age, Mar. p78

Technical Shorts

Finds New Market—Los Angeles Bureau of Water & Power has just lined a 300-million gal. earthen water reservoir with petroleum asphalt. It was sprayed on the sandy loam to reduce seepage losses. Final step will be covering with 10 ft. of compacted earth and 3 in. of asphalt concrete. —Chem Eng, Apr, pPPI-39

20% of Workers Eyes Bad—Riegel Textile Corp. checked vision of all its employees in an effort to lower accident rate. Of 4,000 checked, 800 (20%) were found to have faulty vision. Of the employees who had defects corrected, 38.6% were found to produce more after correction.—Textile World, Apr, p143

Aids Storage Bin Work—Replacing solid backs of parts storage bins with safety expanded wire mesh screening admits light from back as well as front. R. C. Dunean Co. finds it helps to eliminate errors in order filling.—Ind Dist, Apr, p98

Starts Bus Route Off Right—Marion Bus Transportation Co. printed free ride coupons in the local paper to introduce a 2-mi. extension of its route. Coupon was good for 60 days for one ride. Merchants gave patrons a return trip ticket.—Bus Trans, Mar, p60

Air-system Explosions—Research by U. S. Bureau of Mines shows that compressed-air system explosions may be caused by a carbon-oxygen complex formed on carbon deposits in compressors and piping. Such a complex is credited also with causing spontaneous heating of coal.—Power, Apr, p100

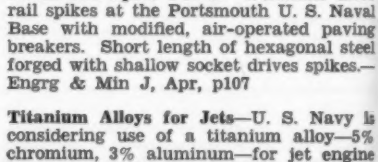
Radar Aids Sea Rescue—Radiomarine Corp. 3.2-cm. radar unit aboard the ship "Stockholm" enabled it to reach the mail-boat "Kronprins Olav" ablaze in the Kattegat Strait in heavy fog. The "Stockholm" picked up the ship on its 12-in. viewing scope. It was the only ship, among several that received the distress signal, that could reach the stricken ship because of the heavy fog.—Marine Engrg & Ship Rev, Apr, p98

Tests for Carbon—Wm. Kennedy & Sons, Ltd.'s foundry in Canada checks carbon in steel by Rockwell hardness test on quenched specimen. Hardness of untempered martensite bears direct relationship to carbon content. Accuracy is within ± 0.02% carbon.—Foundry, Apr, p86

Follow that Peppermint—To find air leaks in pipe lines, air hose, and shut-off valves, essence of peppermint is added to the air system. The nose does the rest. Once-a-month tests make compressor do less work, last longer.—Oper Eng, Apr, p41

Pneumatic Spike Driver—Workmen drive rail spikes at the Portsmouth U. S. Naval Base with modified, air-operated paving breakers. Short length of hexagonal steel forged with shallow socket drives spikes.—Engrg & Min J, Apr, p107

Titanium Alloys for Jets—U. S. Navy is considering use of a titanium alloy—5% chromium, 3% aluminum—for jet engine compressor blades and disks. Alloy is as strong as high-strength steel, weighs half as much.—Aviation Wk, Apr 17, p32



CUTAWAY OF J-42 TURBO-WASP

This schematic diagram of the Pratt & Whitney J-42 turbo-jet is the first released. Utilizing magnesium instead of aluminum in several assemblies, engine is 103.2 in. long, 49.5 in. in dia. Fuel consumption is 109 lb. per hr. per lb. thrust. Wet thrust rating is 5,750 lb. Shown are: (1) accessories, (2) air intake, (3) impeller, (4) fuel supply, (5) igniter, (6) combustion chamber, (7) guide vanes, (8) turbine blades, (9) disk, (10) cooling impeller.—Aviation Wk, Mar 27, p30

Speeds Freight Handling—Boston & Maine Railroad uses overhead conveyors to move l.c.l. freight in its Gardner freighthouse. Pickup and delivery trucks can now be unloaded in 30-45 min., compared to 2-3 hr. Freight is loaded on 4-wheeled dollies. Dollies are marked as to block number. As cars pass block, they are disconnected from line. Empties are returned by the same line.—Railway Age, Feb 25, p47

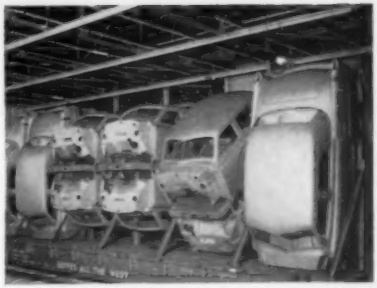
Site-made Muck Bucket—To handle gooey muck—too thin to handle by normal equipment and too thick to pump—H. W. Alward Co. made its own bucket. A 10-ft. section of 60-in. corrugate pipe was used. A bottom was welded on and a wire-rope sling rigged. A total of 15,000 yd. of muck was moved at little extra equipment expense.—Cons Meth & Equip, Mar, p55

Measures Meteor Speed—Continuous-wave radar at Stanford University measures speed of meteors. Transmitter generates signal directed vertically upward; reflections to receiver from ionization columns created by passage of meteors through E region of ionosphere result in whistle indicating speed.—Electronics, Apr, p120

Optical Inspection—Electro-Motive Div., General Motors Corp., inspected engine main-bearing bores, 8½ in. in dia. and 12 ft. long, with sweep bar and indicators; time was 3½ hr. New optical method takes 20 min., saving 7,750 man-hours per year.—Am Mach, Apr 3, p121

Continuous Evaporator—Pasco Packing Co. has developed a high-capacity, three-stage, thermo-compression unit to concentrate orange juice. It operates at night without direct supervision, because instruments control outflow Brix and keep input proportional to discharge.—Food Ind, Apr, p5

Stores Natural Gas—New above-ground gas storage method employs a solid, fireproof adsorbent material, called Methanite, prepared from fullers earth. Gas is compressed, cooled, preheated for removal of moisture, gasoline and liquefied petroleum gases, cooled to remove methane and condense methane, then flashed to low pressure and added to Methanite container.—Oil & Gas J, Mar 30, p59



CUTS SHIPPING COSTS

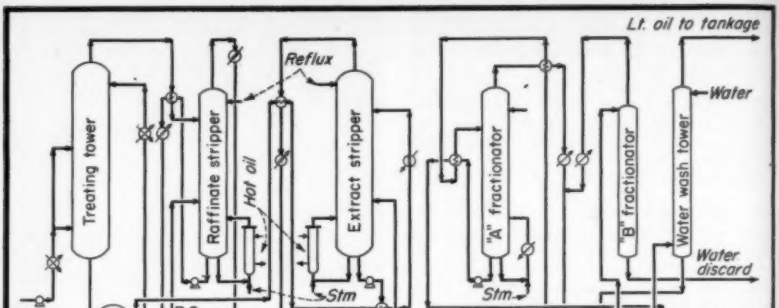
Sixteen Kaiser-Frazer automobile bodies can be shipped on one flat car to assembly plants. Shipping charges and handling costs are less than with box cars. Two bodies are held on each of eight cradles that rotate first for loading and then for standing bodies on end for shipping. Previous bonderizing protects bodies from damage by weather.—Iron Age, Mar 30, p113

Spherical Plug Gages—New type of plug gage developed in England has gaging balls at each end—one for "Go," the other for "No Go." Go gage is ball-shaped with groove, while No Go gage has wheel mounted in forked bracket. Advantages: fast gaging, long life.—Mach, Mar 25, p402

Steel Balls Clear Land—To clear land at Hungry Horse dam site, Wixson & Crowe, Inc. is using 4½-ton, 8-ft. dia. steel balls. Balls, chained together by 30-ft. lengths of chain, are pulled by tractors. Chain, 4 ft. above the ground, snaps brush and small trees.—Eng News-Rec, Apr 6, p25

Reduces Brittle Zones—Fully machinable welds in cast iron can be made with an electrode of pure nickel core and extruded black coating. The electrode, which works with either ac. or dc., minimizes brittle zones.—Steel, Apr 10, p81

Improves Aluminum Formability—High-strength aluminum alloys can be given better formability by resolution treatment at slightly elevated temperatures. Alloys 14S, R301, and 24S are aged at 300-400° F. for 30 min.; 24S Alclad takes 10 min. at 375° F.—Prod Eng, Apr, p5



FLOW DIAGRAM of Texas Co.'s new 8,000-bbl. commercial unit in which . . .

Furfural Refines Gas Oils

Pilot-plant operation for 2 years proved the worth of furfural refining of gas oils. Process now goes into commercial operation

FIRST COMMERCIAL FURFURAL refining unit designed primarily for extracting catalytic cycle gas oils for production of high-quality diesel and home heating fuels has been placed in operation by the Texas Co.

The furfural unit is upgrading catalytic cycle stock. Catalytically cracked cycle gas oil is extracted with furfural to improve the cetane number and burning quality and to reduce the sulphur content.

Flow through the unit is shown in the above diagram. The unit consists of a simplified countercurrent extraction, or treating, tower; product strippers; and solvent-recovery equipment. The decantation system and water wash tower would not be needed with gas oils having initial true boiling points above 360° F.

A solvent dosage of not more than an equal volume of the charge oil is employed at extraction temperatures of 90-125° F. Raffinate and extract phases flow from extraction tower through heat-exchange equipment to separate single-stage solvent-stripping towers. Solvent stripping is accomplished at atmospheric pressure by injection of live steam into each stripper where suitable temperatures are maintained by reboilers using hot oil.

Overhead condensates from strippers flow to decanters and there separate into three immiscible phases. Each phase contains oil, water, and furfural. Oil phase may be recycled to extraction tower, re-

turned to stripper, or charged to water wash tower for furfural recovery.

Water layer is pumped to water removal tower ("B" fractionator) or used as reflux in product strippers. Furfural layer is pumped to "A" fractionator for dehydration and removal of miscible light oil.

Operation of the unit is satisfactory. Cetane number is definitely improved. An example on Arabian cracked stock: charge cetane number—19; raffinate cetane number—61; yield—60% by volume.

Diesel fuels of 50 cetane number made in one case from virgin gas oil and in the other case from furfural refining of catalytic cycle oil were tested in a test engine. After 80 hr. service on each fuel, examination revealed equally low engine deposits and wear.

Sulphur removal is good. Furfural dissolves and removes most of the sulphur constituents. On the Arabian cracked stock in the example given, sulphur was reduced from 1.705% to 0.451% by weight.

Other advantages of furfural refining include substantial removal of nitrogen compounds and lowering of the metal concentration.—Oil & Gas J, Mar 23, p211

Midget Photoelectric Unit

Still in the experimental stage, Bell Telephone Lab's Phototransistor is a new photoelectric cell no larger than a .22-caliber rifle cartridge. An outgrowth of Bell's Transistor (see McG-H Digest, Sept '48, p34), it is simple in construction—a piece of germanium, a semi-conductive metal, connected by two wires.

One wire rests in dimple in germanium disk. Second wire is connected to edge of disk. Light focused on undimpled side of germanium disk controls flow of current through wires. Unit delivers high power. It requires no glass envelope or high inner vacuum.—Business Wk, Apr 8, p63

Indoor Substation Cheaper

Design comparisons for two projected power substations—one to supply 9,300 kva. and the other 18,000 kva.—showed indoor design 3-4% less costly than outdoor design where transfer gear was superimposed on feeder positions to reduce building size.

The outdoor design was the unit substation type. The other was an arrangement with transformers outdoors and metalclad switchgear in a suitable building.

Superimposing transfer gear on main switchgear was found to cut the building area required by 30.8%. While the saving over outdoor installation is small, operation and maintenance with switchgear indoors will give additional savings. —Elec World, Feb 27, p90

FIREPROOF STILL

Vacuum still (left) is protected by novel automatic fire extinguishing system. It is actuated by changes in critical vacuum rather than detection of heat, flame, or smoke. Liquid CO_2 is contained in tank on floor below. Tank is connected to still by ¼-in. line. Should vacuum drop to 25 in. Hg, recording vacuum control automatically actuates circuit that opens CO_2 release valve. —Chem Eng, Mar, p121

Rubber-Covered Cables Spliced Without Molds

New, effective technique makes vulcanized joints and patches in rubber-covered cables without metallic molds. Essential feature of the method is use of pressure tapes around the joint during hot vulcanization. Electrical quality of joints is outstanding.

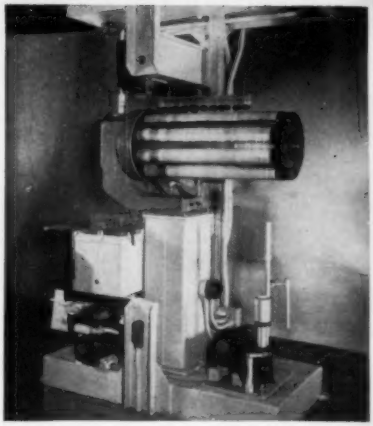
Step-by-step procedure is to:

1. Apply rubber cement on splice and dry.
2. Wrap on rubber splicing tape with 50% overlap, starting ½-1 in. outside the pencilled scarf.
3. Apply code tap "straight jacket" with customary longitudinal joint overlapped to get a good conductor center.
4. Apply pure gum rubber strip to compress splicing stock.
5. Wrap on ½-in. cotton binder tape with 50% overlap.
6. Apply tinned copper tape; this tape distributes heat uniformly.
7. Apply black code tape, which provides surface for absorbing radiant heat.
8. Vulcanize for 1-30 min., depending on conductor size and wall thickness. Copper and cotton tapes and also the straight jacket, if desired, are then removed to complete the job.—Elec World, Feb 27, p80

Fast Delays Improve Blasting

In stoping and similar operations, St. Joseph Lead Co. finds milli-second delays in blasting prevents "hole robbing." Tests were run while cutting a 1,300-ft. level pump sump. First section was blasted with regular delays—65 holes fired simultaneously. Several holes were cut off, leaving powder in holes after blast.

Milli-second delays on the second section fired 78 holes with good fragmentation and all holes broke to bottom with no holes cut off.—Engrg & Min J, Apr, p97



RAYON IN 3½ MINUTES

Continuous rayon filament is spun by this Kuljian Corp. machine in 3½ min. Conventional methods take 4-5 days. Filament travels continuously over reel, passing under a series of chemical jets to fix filament. Machine is capable of spinning from very fine to tire cord filaments. For the larger diameter filaments, a longer drying roll can be attached.—Business Wk, Apr 15, p60

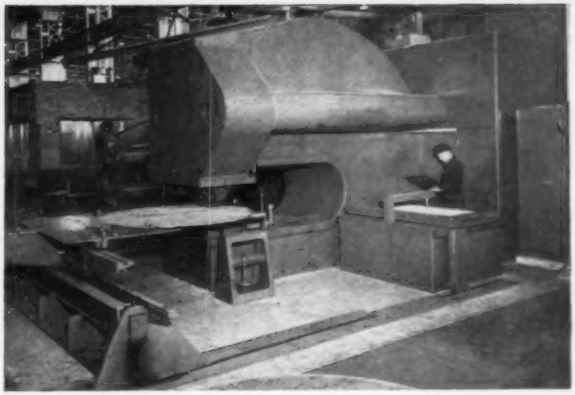
One-Way Pallet Cut Cost 36%

Elimination of manual handling of rolls of Saflex plastic and adaption of one-way wooden pallets have cut Monsanto Chemical Co.'s Plastics Div. handling and shipping costs 36%. A fork-lift truck was purchased to replace hand trucks and the loading platform redesigned.

The one-way wooden pallets are competitive with paper pallets. It is constructed with five 1-in. stringers instead of three 2 x 4-in. stringers.

Now a pallet carries nine rolls, all packaged together. Pallet and paper box cost less than the old one-roll tube used. Only one unit needs be labeled, only one item noted on bill of lading instead of nine. Freight costs are down. One man with the fork truck now handles nine rolls.—Factory, Apr, p58

FOR FASTER TANK WORK



Automatic punch press at C. F. Braun & Co. perforates trays—5-in. holes in ¾-in. plate. Machine has photo-tube head that travels across scaled-down master hole pattern and guides the 300-ton main punch head. Master templets are available for all standard trays.—Am Mach, Mar 20, p89

Spark-Ignition Gas Engine Installed on Gas Line

New-type gas engine installed by Tennessee Gas Transmission Co. is part of 1,600-hp. engine-compressor set. The engine, built by Worthington Pump & Machinery Corp., is a two-cycle, spark-ignition unit.

It features uniflow scavenging with inlet ports in cylinder walls and cam-operated exhaust valves in cylinder heads. Straight-through scavenging is employed for these reasons: (1) Exhaust timing depends on cam-operated valves and not on piston position; it can be adjusted to give greater exhaust area. (2) Larger volume of scavenging area may be used. (3) Earlier exhaust closing is possible, which permits some supercharging.

Increased blowdown, supercharging, and air flow in a straight line result in charging the cylinder with a greater weight of air. Higher mean pressure can therefore be developed without higher temperature. Proportion of pure air is high. These factors permit operation at higher compression pressures—about 280 psi. compared with the conventional 150 psi.

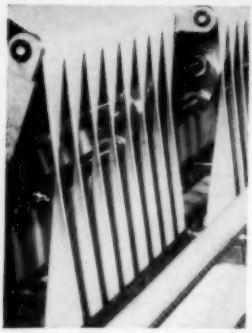
One interesting construction feature is the cylinder liners. They are removable and have water jackets cast into them.—Power, Apr, p124

New Synthetic Lubricant

Recently announced synthetic lubricant, which can be made from refinery by-products, coal, or shale, has quality standards claimed to be not available from petroleum oils without elaborate procedures. The lubricant, made by Socony-Vacuum Oil Co., is based on an intermediate chemical called decene. It is produced by polymerizing decene by heat without a catalyst.—Oil & Gas J, Mar 30, p57

Have You Read Page 31?

It tells you how we believe the McGraw-Hill Digest should be used to give you the fullest possible benefits. It lists the many services that we offer you and how you can take advantage of them. Please turn back to p31.—The Editors



CHEESE FORMED, CUT, PACKED CONTINUOUSLY

Kraft Food Co. factory-packs process-cheese slices. Each package contains eight 3-in. square slices, weighs ½ lb. Pasteurized cheeze, while still fluid, is formed on chilled drum into thin sheet ⅛ in. thick. As it comes from drum, it is cut into 3-in. wide ribbons.

Ribbons are automatically gathered in four stacks of eight continuous strips. They move on endless belts to the cross-cutting machine. Here, a cutter slices through the stacks to produce the eight 3-in. square piles, which then are carried to the packing department.

Cut stacks are automatically wrapped in transparent coated cellophane, heat-sealed, then conveyed to the carton line. At present, four different flavors are being slice-packed. Consumer can easily separate and remove slices from the wrapper.—Food Ind, Apr, p42

Large Pipe Welded To Save Field Time, Cut Handling

The "double-ending" process is relatively new in pipeline work. It means joining two 30-ft. lengths into 60-ft. lengths to cut field welding in half and reduce handling time.

Betchel Corp. is double-ending pipe for Pacific Gas & Electric Co.'s "Super-Inch" line. On the first jig, an electric device creeps down inside the pipe under its own power to the spot where the two ends meet. There, it expands to form a bridge between the two sections and bring them into alignment with $\frac{3}{32}$-in. space between ends.

Two manual arc weldors lay the first bead. The pipe is lifted by hydraulic lifts to rolldown rails leading to the second jig. Here another weldor lays the second bead while using a foot control to revolve the pipe slowly. His assistant removes flux.

Third and final weld is made by submerged-melt machine. Voltage is held at 28 volts, but current is high—about 580 amp. The deposit is a thick layer that results in a joint 70% stronger than the parent metal.—Weld Eng, Apr, p24

Vanadium Isotope Found

New form of vanadium for use in alloy steels has been discovered. It is an isotope of the element, weighing one unit less than ordinary vanadium but occurring only one part in 400 in the material as found in nature.

The new material was discovered independently by the Argonne National Laboratory and University of Minnesota. It is the seventh of over a thousand isotopes to have odd numbers of neutrons and protons.—Prod Eng, Apr, p150

Conditions Govern Blast Holes

Ease of drilling may bear little relation to physical properties of rock. Percussion drilling equipment replacing diamond drilling and vice versa

A FEW YEARS AGO it was easy to select equipment for drilling blast holes. But today, with the great variety of available equipment coupled with improved blasting techniques, selection of equipment is more difficult.

Surface operations present the most variables in drilling—weather, weathering of seamy rock, difficult topography, overburden. Short- and long-hole underground drilling present their own problems.

Ease with which a hole is drilled in rock offers little relation to the physical properties of that rock. Common percussion drilling in hard, coarse-grained rock—such as granite—may be more rapid and cheaper than diamond drilling.

On the other hand, fine-grained, tough, basic rock—such as basalt—is sometimes drilled more slowly and with more cost with percussion drills than with diamond drills. When rock is hard, fine-grained, and tough—as in rhyolites, cherts, or siliceous ore—both groups of equipment have difficulty.

Generally speaking, percussion tools work best in rock that chips and fractures well, regardless of hardness of the rock. This action is amplified in coarse-grained rock. Many tough rocks, particularly when siliceous, respond better to grinding of diamond drills, at least in operation if not in cost.

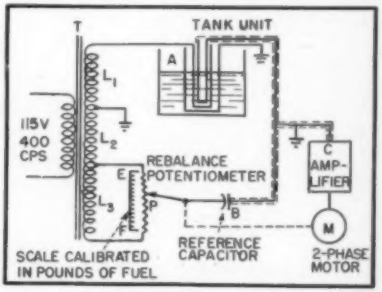
Broken ground conditions affect percussion drills little but are costly for diamond drilling. Badly jointed or "fitchery" conditions may cause drill steel to stick close to collar, whereas diamonds are not prone to stick.

Percussion drilling has dominated short-hole work for years. Rapid loss in bit gage limited depths possible. Tungsten-carbide-tipped steels have cut out this limitation. And with the advent of sectional steel, the medium has been invading the long-hole field with success.

Underground, blast holes are commonly drilled 1¼-2½ in. dia. and 6-12 ft. deep. Pneumatic, wet-type percussion equipment is usually selected. Metal-mining tendency has been toward use of 3½-in. automatic-feed, long-shell drifter drills in drifts and stopes. European and South African mines have diverged from the standard and have used light, hand-held jackhammers. Addition of a supporting airleg and use of tungsten-carbide-tipped steel have improved the equipment's efficiency.

Long-hole, sub-level stoping field has been dominated by diamond drilling for years. High cost of diamonds has now caused management to shift to percussion.

Surface work grief with small holes is



GIVES FUEL WEIGHT

Airplane fuel gage for military aircraft has concentric tube A mounted vertically in gasoline tank. When tank is empty, capitance of A equal that of B. If voltages across L_1 and L_2 are equal, there is no voltage fed to amplifier C, no movement of motor M, and arm of potentiometer P remains at empty mark E. As fuel is added to tank, impedance of A increases, causing a self-balancing of bridge and movement of potentiometer arm across gage.—Electronics, Apr, p77

"FLYING CRANE"

Hughes Aircraft Co.'s XH-17 jet-powered helicopter has been removed from the secret list. Twin General Electric J-35 jets, rated at 5,000-lb. thrust, drive the 136-ft. dia. rotors. 'Copter is designed for short-haul movement of heavy equipment. Cockpit is about 20 ft. above the ground.—Aviation Wk, Apr 3, p15

reduced by employing larger and fewer holes, more rugged equipment, heavier explosive charges. These give effective fragmentation with current short-period delays (see p46).

Water is not used extensively in surface drilling—water complicating winter work, crushing and screening operations. The tendency seems to be overdone. Water would cool bit, support shank, improve bit and shank life, and increase footage per shift.

To operate high benches where ground is too rough for heavy equipment, diamond equipment is used. Large quarries and open pits are using churn drills. Although the equipment has been enlarged and improved mechanically, little change has been made in churn drills.—Engr & Min J, Apr, p86

How Long Should Rails Be?

Railroad men are asking whether the standard 39-ft. rail is economical. About 25% of current railroad maintenance-of-way budget is spent on track laying and surfacing. About half this total goes into maintenance of rail joints. Railroad men are thinking in terms of a 78-ft. standard rail. By adoption of this rail, half the joint maintenance costs would be saved.—Railway Engrg & Maint, Apr, p358

Bad Conditions Do Not Bar Mechanized Mining Success

In September 1948, Tennessee Coal Co.'s Mine No. 3 was a hand-loading operation. Now it is an efficient, 850-ton per shift mechanized mine. The change was made despite extremely hard drilling conditions and a bottom so soft that all haulageways had to be planked.

On the day the mechanical equipment arrived, not one operator in the mine had seen, much less operated, any of the equipment. In three days it was working—before the manufacturer's representatives appeared.

Mine is a slope operation in coal 60-84 in. thick, seam lying nearly level with grades up to 5%. Top is reliable sandstone. Coal parts freely, little timbering being required. Bottom is 4–5 in. of rock on a 2-ft. stratum of soapstone. Where traffic is heavy—in all haulageways except for 50 ft. at face—floors must be planked.

Mine plane was not changed when mine was mechanized. Rooms 30 ft. wide and 200 ft. deep on 50-ft. centers are driven off both sides of triple-heading panel entries. Entries are driven on 480-ft. centers. Rooms are cut together at inky ends.—Coal Age, Apr, p66

Resin-Sand Mold Process May Replace Current Molds

A thin, porous foundry mold sand of heat-setting phenolic plastic resin and a little foundry sand has been developed by Bakelite Div., Union Carbide & Carbon Corp. The new process, originally developed in Germany, supposedly will give greater accuracy at lower cost. Foundry process will be simplified, thus will be faster.

Metal pattern is first heated. Then a blend of the resin and sand is applied while pattern is hot. Resin melts and forms a thin shell of sand over the pattern. Shell is hardened in oven. After it is stripped, the two halves are placed together and metal is poured. Shells are backed up in mold box by steel shot.

Experimental casting has been done with metals ranging from aluminum to stainless steel. Biggest casting to date weighs 100 lb.

Developers believe process may save up to 90% of the sand currently used; high mold-maker wages will be saved; removal of casting is easy. Since shell is porous, gases can escape readily from metal. Smoother surfaces are possible—engineers expect tolerances of 0.002-0.003 in. Such tolerance would eliminate much supplementary finishing.

Disadvantages in the process seem to be the specialized ovens necessary to heat pattern and cure mold. Patterns, being metal, may cost more than standard wood patterns.—Business Wk, Apr 8, p54

Mine Belt-Haulage Economies

Three-section belt conveyor moves coal 2,462 ft. down the mountainside to tipple from a strip operation at 8,000-ft. altitude, highest in the U. S. Previously, coal was hauled by truck over 6 mi. of mountain-shelf road. The 42-in. belt lowers the coal 700 ft. vertically. Entire belt is covered.

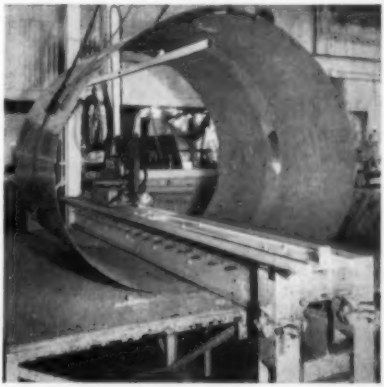
As a byproduct, the energy derived from the lowering of the coal is utilized to generate electricity, the setup being similar to that used in hydroelectric generation.

First belt section covers a 29% grade, moving coal 711 ft. Second is 1,282 ft. long and is on an average grade of 15%. Third conveyor is 469 ft. long and lowers coal 80 ft.—Coal Age, Apr, p84

Creosote Laminated Arches

Treatment of glued laminated bridge members with creosote has not weakened glue lines. Bridge is a 120-ft., two-hinged timber arch structure for rail, automotive, and pedestrian traffic.

Rock walls of gorge form ideal supports against thrust. Four arches support stringers, outer two being 18 x 18 in., inner two being 16 x 18 in. Two inner arches are almost directly under tracks. —Cons Meth & Equip, Mar, p90



INERT-ARC TANK FIXTURE

Stainless steel in 12-ft. sections and in thicknesses from 28-gage sheet to ¼-in. plates is welded in this fixture at McHale Mfg. Co. Sheets are aligned over relief groove in copper backup bar and held by air-powered fingers. Welding is by inert-arc head moving along tracks at 4-60 ipm., depending on material and thickness.—Weld Eng, Mar, p54

New Products

Couples Shafts—Magic-Grip coupling for pump or motor shafts consists of two cast-iron disks with tapered bores, rubber-covered tubes assembled on studs, split tapered bushings, and two set screws for each disk. It can be installed quickly. Bore sizes are ⅝ and 2⅛ in.; both can take 120 hp. at 3,550 rpm.—**Allis-Chalmers Mfg. Co.**—Prod Eng, Mar, p166

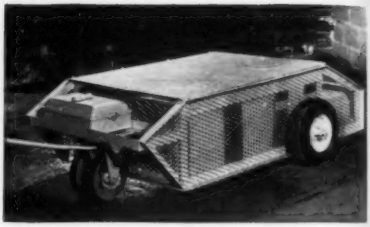
Automatic Recloser—Type FR-3 three-phase recloser has common linkage to provide positive operation in locking out all three phases whenever a fault occurs. Short-circuit interrupting capacity is 3,000 amp. Maximum service ratings are 100 amp., 15,000 v.—**General Electric Co.**—Elec World, Mar 27, p136

Wood Chipper—Wood wastes up to 12½ in. dia. can be fed into a diesel-powered, portable wood chipper. Rotating cutting knives turn out chips at the rate of 10-15 cords per hr. For portable installations, chipper is mounted on a semi-trailer.—**D. A. Murray Mfg. Co.**—Business Wk, Mar 11, p88

Two Men Move Loom—New loom dolly permits two men to move textile loom about plant without skidding. Loom can be lowered squarely into final position. Dolly set consists of a dolly for front girt and one for rear girt.—**Hunt Machine Works, Inc.**—Textile World, Apr, p147

Electric Hoist—Load King hoist has lifting speed up to 41 fpm., lower and upper limit stop, wide pickup angle, and link chain over electrically driven sheave. Capacities are 500, 1,000, and 1,500 lb.—**Yale & Towne Mfg. Co.**—Iron Age, Mar 30, p 188

Plastic Pipe Passes Mine Test—In 20-mo. test in three mine installations, Carbon "E" plastic pipe has showed no deterioration. Carrying acid mine waters, standard pipe would have been replaced several times in same period. A 100-ft. length weighs 90 lb.; flexibility permits pipe to follow irregular contour, hug ground. Tensile strength is 1,400 psi.—**Carter Products Corp.**—Engr & Min J, Apr, p123



PORTABLE SUBSTATION

This rubber-tired, portable a-c. substation is used in West Virginia coal mine to provide power at the face. Eliminated are power losses and high-voltage lines in sections. Mine is in low coal, remaining life expectancy being only 2 yr. Circuit breaker at front controls 220-v. current for cutting machines. At rear is a 440-v. circuit breaker for incoming power and two lever-type plugs and receptacles for 220-v. cables.—Coal Age, Apr, p98

Mixes Concrete—Lightweight truck mixers are available in sizes of 2, 3, 4½, and 5½ yd. Blade design gives fast discharge of lowest slump concrete. Large hopper opening allows rapid charging.—**Worthington Pump & Machinery Corp.**—Am Builder, Apr, p152

Conditions Ink—Tackiness of letterpress, offset, and gloss inks is reduced without destroying body by a new conditioner. Drying is not retarded; ink does not overprint.—**Sun Chemical Co.**—Mod Packaging, Mar, p136

Saw-sander Combination—Four-in. belt sander converts to a 6-in. portable saw. Tool weighs 18 lb. Tension latch permits quick change of belt.—**Cummins Business Machines Co.**—Ind Dist, Apr, p108

Don't Paint This Fence—Chain link fence is made of Copperweld, which consists of pure copper coating welded to high-strength steel core. As copper does not rust, fence needs no painting.—**Copperweld Steel Co.**—Elec West, Mar, p44

Remote-controlled Tractor—Controls on the Clarkette 5 materials-handling towing tractor permit the operator to walk beside the tractor and load train as he goes. Control bar extends across width of tractor above cowl. Moving bar forward moves train forward a few feet. Brake bar extends from rear of tractor. Operator can ride tractor.—**Clark Equipment Co., Industrial Truck Div.**—Factory, Apr, p93

Standby Lighting Plant—Unit, powered with two-cylinder air-cooled engine, is equipped with magneto, needs no batteries. Rated capacity of generator is 5 kw., starts single-phase motors up to 3 hp.—**Kato Engrg Co.**—Power, Apr, p150

Chipping Hammers—New line of hammers have had piston life increased about 12 times by hardfacing process. Improved air valve proportions air accurately to maintain top cutting efficiency. Fifteen power sizes with five basic hammer sizes are offered.—**Ingersoll-Rand Co.**—Foundry, Apr, p205

Foot-powered Hoist—Bossun's chair-type platform hoist is raised or lowered by bicycle pedals connected by cable to drum. It can move 25 fps. Capacity is 625 lb. Hard rubber front rollers protect surface. —**Safeway Steel Products, Inc.**—Eng News-Rec, Apr 6, p98

Gear Motor—New 1½-hp. gear motor is for operation on single or polyphase ac. or on dc. Speed range is 25-280 rpm. Units are designed for high-torque, slow-speed requirements.—**Century Electric Co.**—Elec C&M, Mar, p85

High-speed Forcing Press—Ram speed of 275 ipm., gap of 82 in., and stroke of 48 in. feature new four-post hydraulic forcing press. Press table is 36x60 in. and has 10-in. center hole to receive shafts.—**Hannifin Corp.**—Steel, Mar 27, p102

Seals Wood—New sealer acts as penetrating, non-sanding, moisture-resistant undercoat for lacquers, enamels, paints. It is recommended for all woods, including plywood. It has an alkyd base. Possible uses include brush handles, wooden bobbins for textile mills, doors, mill work.—**Monsanto Chemical Co.**—Chem Eng, Apr, p168

Deaerating Heater—Two stage heater reduces oxygen in feedwater to less than 0.005 ml. per liter. CO_2 is completely removed. Countercurrent flow of steam and water accomplishes deaeration. Sizes range up to 2-million lb. per hr.—**Graver Water Conditioning Co.**—Oper Eng, Mar, p66

Grinds Knives—DN series automatic knife grinder for paper industry is available in sizes up to 108 in. in workpiece capacity. Permanently aligned knife bar promises more accurate cutting edges and longer blades.—**Hanchett Mfg. Co.**—Paper Ind, Mar, p 1480

Small-boat Radar—Mariners Pathfinder Jr. is radar system for small craft. It operates on 3.2-cm. wavelength, has range of 75 yd. to 20 mi., range and bearing accuracies within 2%. It operates on 32-v., 110-v. or 220-v. dc. or 115-v. ac.—**Raytheon Mfg. Co.**—Electronics, Apr, p214

YARN CONDITIONED IN WINDING

Conditioning device attached to a cone winder permits treatment of yarn during actual cone-winding operation. Yarn package is conditioned not the single end. This gives greater uniformity in the package. Excessive throw-off of emulsion is said to be eliminated. Kearney Mfg. Co. is the developer.—Textile World, Apr, p147

New Products (Cont.)

Listens to Gears—External and internal gears can be sound tested in unit that detects gear sets objectionably noisy in operation. Machine is built in two sizes—one for gears up to 14-in. dia., the other up to 24-in. dia. Tests are run at four speeds in either direction and with or without gear loading.—**National Broach & Machine Co.**—Am Mach, Apr 3, p196

Metal Putty—Auto body repair is speeded by a metal putty substitute for solder. It hardens without shrinking, can be filed, sanded, ground, wire brushed. Moreover, it is impervious to all liquids auto bodies normally encounter. Three lb. will fill as much as 14 lb. of solder.—**McKay Co.**—Fleet Owner, Mar, p55

Electronic Sorter—Cans of food are automatically separated by content or grade by machine that reads magnetic markings applied before cans enter cooker. Can tops and bottoms are magnetized with combinations of positive and negative charges. Capacity is 475 cans per min.—**Industrial Electronic Engineers**—Food Ind, Apr, p91

Charges Batteries—Single control governs two clocks, one that limits charging to 9 hr. and another that shifts unit from high charging rate to low finishing rate. This selenium-rectifier charger is for 12-v., 11-plate or for 6-cell, 13-plate batteries.—**Automatic Transportation Co.** — Elec World, Apr 3, p29

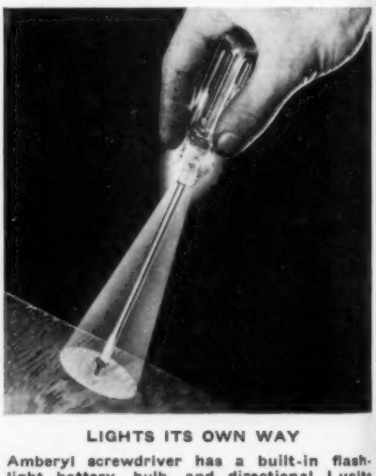
Lorain Pipeliners — Pipeliner Junior is ¾-yd. crawler crane of extra-wide gage and is designed around Lorain TL-25 turntable. Pipeliner Senior is a 1-yd. unit. Front-end interchangeability provides changing from hoe to shovel, crane, clam shell, or dragline.—**Thew Shovel Co.**—Oil & Gas J, Apr 13, p122

Provides Smooth Fluid Flow—New surge damping valve prevents shock rather than absorbing it. It can be adapted to any circuit without modifying the circuit. Claimed advantages: lightweight, small, no manual adjustments or external drain, allows free return flow, no seals to leak, adjusts automatically.—**Denison Engrg. Co.**—Aviation Wk, Apr 3, p45

Truck-mounted Ladder—Aluminum ladder can be mounted on the bed of any truck to make up a serviceable maintenance unit. Rungs are corrugated for safety. Mounting ladder at 18° from rear of truck bed permits servicing street lights from outside parked cars.—**Line Material Co.**—Elec West, Feb, p28

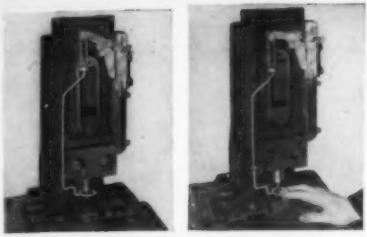
Valve Handles Corrosives—Valve body is made of nearly diamond-hard Merit Ceramic and is suitable for continuous 300-psi. operation. It will handle highly corrosive gases and concentrated or diluted chemicals, except hydrofluoric acid and hot alkali concentrate. Sizes are ½-3 in.—**Emmett Machine & Mfg. Co.**—Prod Eng, Apr, p164

Combination Welder-Power Plant — Engine-driven 200-amp. a-c. welder is combined with 3-kw. power plant in either stationary or portable rig. Welder handles electrodes up to 3/16-in. in dia. Generator supplies power of 110-220 v., 60 cycle, single phase.—**Miller Electric Mfg. Co.**—Weld Eng, Apr, p42



LIGHTS ITS OWN WAY

Amberyl screwdriver has a built-in flashlight battery, bulb, and directional Lucite lens. Designed for dark-corner work, it can take a slotted or Phillips bit. It is made by Vaco Products Co.—Oper Eng, Apr, p68



SAVES OPERATOR'S FINGERS

Fingers of press operators cannot be smashed when this protective device for foot-operated presses is used. It does not slow up press operation. When press is being loaded, guard wire is out of the way (left). When press is operating (right), hand contact with guard stops press. It is a development of White Corp.—Factory, Apr, p92

High-pressure Expansion Joint—Units, designed for 1,000-psi. pressures, are for axial, offset, and radial motion control in high-pressure piping systems. Joint consists of corrugated bellows-type section formed within control rings and end section.—**Chicago Metal Hose Corp.**—Oil & Gas J, Mar 30, p130

Toolroom Grinder — Type 2F surface grinder has work capacity of 24 in., table movement of 29 in., traverse of 8 in., and vertical adjustment of 10 in. Wheel is 12x¾ in. by 3-in. bore. Wheel speeds are 1,800 and 3,600 rpm.—**Thompson Grinder Co.**—Iron Age, Mar 23, p38

Vertical Column Light—Fluorescent columnar light, 9½ ft. high and 8½ in. square, is designed for illumination of terminal yards, gasoline stations, similar installations. Four 40-w. lamps are mounted behind removable glass panels. Fittings are provided for air or water line. —**Steber Mfg. Co.**—Fleet Qwner, Apr, p57

Rubber Pads for RR Tracks—Special railroad track tie-plate assembly of rubber has been developed. Assembly has a double-shoulder steel tie-plate secured to ties by independent fastenings. Rubber rail seat is inserted between plate and rail base.—**Railroad Rubber Products, Inc.**—Railway Engrg & Maint, Mar, p270

Handles Coils—Material up to 6 in. wide and coils to 40-in. O. D. and 1,000 lb. can be handled in Model ACCI-640 motorized automatic coil cradle. Mercury-switch control assures loose loop between cradle and fabricating machine.—**U. S. Tool Co., Inc.**—Am Mach, Mar 20, p148

Turbine Pump—Vertical unit, called Watermaster, is for deep wells as small as 4 in. in dia. and delivers from 15-115 gpm. It has glass-lined bowls and bronze impellers. Column sections 5 ft. long make it easily installed.—**A. O. Smith Corp.**—Oper Eng, Apr, p76

Plate Cutter—Movable upper tool, reciprocating at high speed, cuts steel plate to 11/32-in. thickness without chipping or deforming edges. Machine will do straight or circular cutting, slot cutting, beading, folding, flanging, nibbling.—**American Pullmax Co.**—Steel, Apr 10, p122

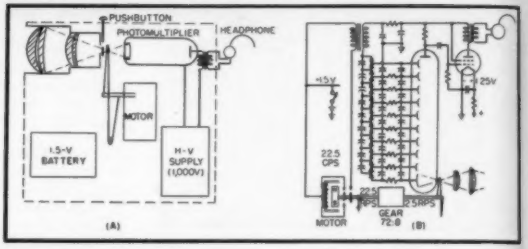
Portable Oscilloscope—Type 292 3-in. cathode-ray oscilloscope weighs only 21 lb. Input signals of 0.4 rms. volt and 0.56 rms. volt produce 1-in. deflection on vertical and horizontal axes respectively.—**Allen B. Du Mont Laboratories, Inc.**—Electronics, Apr, p126

Refrigeration Compressors—New line handles 15-275 hp. equivalent of refrigeration. Machines are said to have long life because cylinder liners and other parts subject to wear are easily replaceable. Units come with 4, 6, 8, 12, or 16 cylinders.—**York Corp.**—Chem Eng, Mar, p144

Boiler Feed Pump—Regenerative-turbine-type pump has mechanical pressure seals and permanently lubricated ball bearings. Tension on sealing surfaces adjusts automatically in proportion to pump presure. —**Fred H. Schaub Engrg. Co.**—Power, Apr, p148

READER SERVICE

As a special service to our subscribers, McGraw-Hill Digest will furnish without any charge additional information about any new product or technical development described. Address your letter to: The Editor, the McGraw-Hill Digest, 330 West 42nd St., New York 18, N. Y., U. S. A. —*THE EDITORS*



***DEVICE** for guiding blind persons is shown with external view at left, mechanical arrangement in (A), and simplified schematic diagram in (B). Operation is based on . . .*

Optar—Optical Ranging System

New system is based on photoelectric exploration of images formed by lens system and reveals the location of objects over short ranges

OPTICAL AND ELECTRONIC principles have been combined to form an ingenious ranging system. Known as optar (optical automatic ranging), the system makes use of a lens, light chopper, and phototube to explore space for illuminated objects, just as radar explores space for reflecting objects.

The optar principle is good for short distances, from a few inches to a few hundred feet. Applications include automatic focussing attachment for motion-picture and television cameras, short-range radar detection with infrared radiation, and guidance for blind persons.

Optar measures the distance to an object by locating its image in a lens system and translating the image distance to the corresponding object distance. Image space is explored by light chopping, that is, by moving parallel opaque bars across the space to modulate the light.

When plane of bars and image plane coincide, modulation percentage is maximum. As the planes move apart, modulation percentage decreases. A phototube views the light passing through the chopper. The a-c. component of the phototube current indicates presence or absence of an image.

Moving the chopper through the image space can locate all images. Reference to a chart then gives the image distance. When an extended object is viewed, the device operates on brightness differences.

The first device built on the optar principle was for blind guidance. Power supply is a single flashlight cell good for 100 hr. of continuous use.

A pushbutton opens the lens aperture and operates the power switch simultaneously. A motor drives the light chopper; this is a disk that carries on its periphery a film printed with comb segments.

The light passing through the comb is collected by a 931-A multipher phototube. The ten stages are operated at 80-120 volts per stage. Photo-tube current is translated to sound in the earphones.

The person using the guidance device learns quickly to associate a given series of tones with a corresponding arrangement of objects in front of him. As the device scans only in depth, moving it side to side distinguishes lateral edges of the object.—Electronics, Apr, p102.

TRANSMISSION CYLINDER, held in pot chuck, has gear teeth cut by form tools

Form-Cuts Precision Gears for Automobile Transmission

Automatic transmission for Packard automobiles has a 12-in. dia. hydraulic cylinder housing, piston, and pressure plate. The cylinder has internal stub involute teeth, while piston and plate have mating external teeth. Alternate pairs of teeth are machined off.

With conventional methods, 12 single-spindle gear generating machines and 6 eight-spindle gear generators would have been needed to meet the production rate required. But two Michigan Tool Shear-Speed gear shapers, equipped with radially fed form tools, cut all teeth for each part in 24 sec.

Operation of cutting internal teeth is similar to that for external gears. Form tools are fed outward before each stroke of the work arbor. Before the return stroke, they are retracted inward to clear the work.

Output of pressure plates or pistons is 200–240 per hr. Tools are not interchangeable for the two parts. Cylinder production is lower, 85-90 per hr. because of the longer loading time required for cylinders compared with other parts. —Iron Age, Mar 30, p101

Textile Workers Buy Homes From Avondale Textile Mills

Avondale Mills, textile manufacturers, have sold its remaining 932 homes to mill employees. Price: $12,000. Terms: 12 yr. at 4% interest, payments being deducted by the payroll department. Selling homes paid double for Avondale. Home-owners are more stable, more dependable. Also the company was able to unfreeze assets tied up in the homes.

Survey shows 83% of the employees now to be home owners or members of home-owning families.

When employees are hired, they are given a handbook on Avondale. One of the chapters is on investments. The mill encourages employees to buy farm land and build on it. Avondale arranges the loan for such purchases.

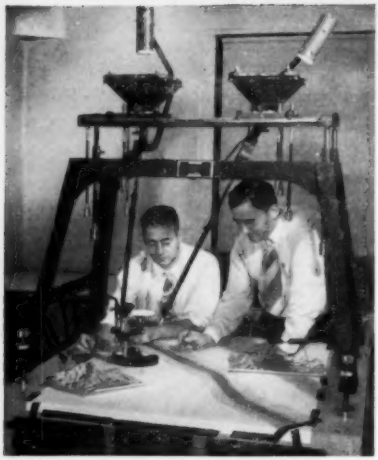
To sell the company-owned homes, Avondale gave first choice to employees living in single-family dwellings. In two-family dwelling, the family that moved in first had priority.—Business Wk, Apr 8, p30

Grooved Nails Add Strength

Tests conducted by the Wood Research Lab, Virginia Polytechnic Institute, showed that grooved nails can improve strength in wood framing. Tests were conducted on unsheathed frames 6 ft. long, 8 ft. high of 2 x 4-in. dense, selected southern pine, both seasoned and green. Both plain shank and grooved nails were low-carbon SAE 1010 steel.

The 3- and 3½-in. long annularly grooved nails had grooves spaced 0.06-in. center-to-center. Grooving began 1 and 1½ in. below head.

The annularly grooved nails offered 2.3–9.1 times greater withdrawal resistance, 1.8–2.3 times more lateral load-carrying capacity in side-grained lumber, and 1.5–2.0 times greater axial withdrawal resistance in end-grain lumber.—Eng News-Rec, Apr 6, p32



KELSH PLOTTER employs filtered light to produce contour map from aerial photographs

Aerial Profiling of Line Halves Engineering Costs

Power transmission line over rugged mountains and through forests was accurately profiled by West Penn Power Co., Penna., from aerial photographs. This new profiling method:

- Cut engineering costs in half.
- Saved a year's time in survey work on the 62-mile line.
- Required only one survey crew on the job.
- Permitted construction 3 months after the line was authorized.
- Established grade on the entire line before portions had been entered.

Profiling was done by a new aerial photographic technique that yields topographical and profile maps with 10-ft. contours and an accuracy within $\pm$ 5 ft. The maps are plotted with a Kelsh plotter.

This device uses aerial photographs that overlap at least 55%. Glass plates of two adjacent photographs are focused to form a single image, then projected by filtered light onto a moveable platen to determine relative elevation of points. —Elec World, Apr 10, p89

Improves Fish Quality

Washed fish keep better. Organoleptic spoilage occurs quicker in unwashed fillets. Washing in an acid phosphate and sodium nitrate solution does not improve the keeping quality.

These conclusions were drawn from experiments made at Pacific Fisheries Experimental Station, Vancouver, B. C. Brill, lincod, and chum salmon were tested.

This method was found to be the best of those tried: Fish were headed and dressed without washing, then placed in a rotary washer and washed for 1 min. at 30 rpm. Fish were next washed in running water.

Filleting was promptly done on boards that had been scrubbed with 1% sodium hypochlorite solution and thoroughly rinsed. Boards were washed with stream of water during the cutting process.—Food Ind, Apr, p117

Willys To Use F-Head Engine

Willys-Overland Motors, Inc., 1950 models will employ F-head engines, the only U. S. vehicle currently using this type engine. It is basically the same as its predecessors except for the new head and valve train. Cylinder block, rods, pistons, crankshaft, and other parts remain interchangeable. Only change below head is a new camshaft for intake valves—exhaust valve cams have not been changed.

With exhaust valve remaining the same in design and timing, the shift to higher compression ratios necessitated added protection of "free" type exhaust valve rotators and hard facing of valves. —Auto Ind, Apr 1, p34

How To Clean Ball Bearings

Where grease is the lubricant, ball bearings should be cleaned periodically, especially on high-speed equipment. This can be done with the bearings on the shaft.

First, wipe the bearing housing and grease fittings clean. Remove the fill and drain the fittings. Then, with the motor running, put about ¼ cup of solvent (carbon tetrachloride or heated mineral oil) into the bearing housing through the fill hole.

Add solvent until it drains out clear, insert drain plug, run motor a few minutes, and drain. Repeat until the solvent comes out clean. Finish off by adding recommended grade, quality, and quantity of grease.—Oper Eng, Mar, p33

UNDERGROUND JEEP

This converted jeep, Dulin Mining Co. claims, has made possible 10-fold increase in bauxite production at its Arkansas mine. Tandem-size type hauling frame converts Jeep to mine vehicle. Fuel is butane to eliminate carbon-monoxide hazard.—Steel, Mar 6, p66

Another DIGEST Service Helps Your Business

Have you taken advantage of one of the most popular McGraw-Hill DIGEST services—provided in the Production Ideas department (page 61)? In this feature the editors each month list new catalogs which, because of the importance of the field or product they describe and the careful thoroughness of the coverage, are likely to be of special value to overseas executives. The fact that hundreds of readers avail themselves of this service every month indicates to the editors its importance as an aid to busy and progressive management and technical leaders.

But have you, as a reader, been aware of the fact that many of the advertising pages in each issue also make offers of special services?

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Today's drive to cut costs and boost profits is world wide. DIGEST editors know from their heavy weekly mail that executives everywhere are searching for cheaper ways to handle materials as one of the quickest ways to reduce production costs. More than one advertiser in this issue offers specialized information on this problem—all of which supplements articles which the editors are running in increasing numbers to meet the mounting demand from readers.

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Production Ideas

from Manufacturers' Catalogs

6-1 Use of Portable Tools—Rotor Tool Co. 24p. Uses, fallacies in figuring, selection of portable tools are covered in a compilation of magazine articles titled "How to Choose and Use Portable Tools."

6-2 Diesel Engines—Nordberg Mfg. Co. 12p and 6p. Bulletin 173 gives technical data on type TS and TSM29 two-cycle diesel engines for marine or stationary services. Bulletin 175 covers types DBM and DBMT-24 four-cycle marine diesels.

6-3 Textile Roll Coverings—Armstrong Cork Co. 16p. Cork and accotex textile cots, their use with various fibers, plus roll shop equipment and mill supplies pictured and applications discussed.

6-4 Expansion Boring Tools—Davis Boring Tool Div., Giddings & Lewis Machine Tool Co. 60p. Four bulletins cover engineering data, in sketch and tables, for block type, "L" type boring tools, fly cutter tools, and line boring tools.

6-5 Fire Fighting Equipment—Ansul Chemical Co. 16p. Dry chemical hand, wheeled, stationary, and truck extinguishers shown with specifications. Comparative effectiveness tables given.

6-6 Tenite Injection Moldings — Tennessee Eastman Corp. 55p. Detailed data on choice of material, product design, injection molding machines, mold design and construction, finishing operations given for Tenite I and Tenite II.

6-7 Turret Lathes—Potter & Johnston Co. 16p. General description, special features, specifications for the complete line of automatic turret lathes given in Bulletin 139.

6-8 Lighting Equipment — Benjamin Electric Mfg. Co. 39p. Bulletin 1e gives complete data on complete line of incandescent and fluorescent lighting equipment.

6-9 Centrifuges—The Sharples Corp. 24p. Bulletin 1248 gives industrial uses for and capacities and specification of laboratory and commercial super-centrifuges.

6-10 Thermal Insulation — Owens-Corning Fiberglas Corp. 16p. Properties and characteristics of all Fiberglas insulation given in Bulletin No. 37.

6-11 Carbide Tools—Vascoloy-Ramet Corp. 89p. Technical data for use of carbide or tantung cutting, boring, and mill, tipped center tools and blanks given in Catalog VR-440.

6-12 Thermocouples—Wheelco Instruments Co. 40p. Various thermocouples and thermocouple assemblies shown in diagrams. Engineering tables also given in Bulletin T/C7.

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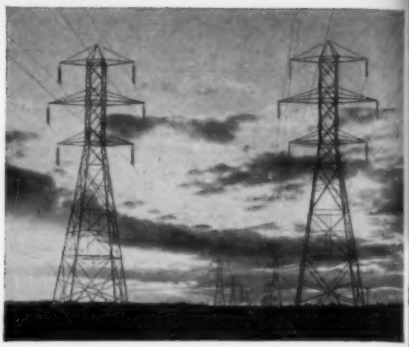

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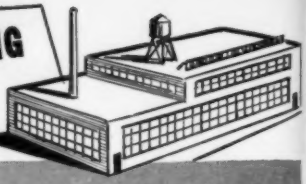

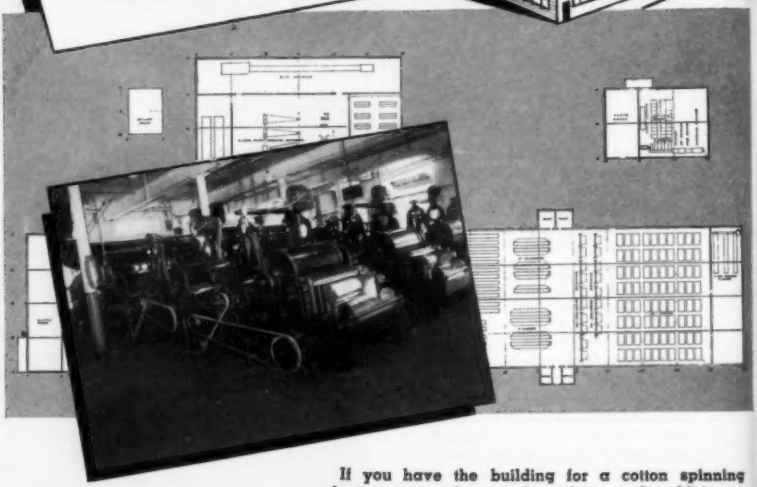

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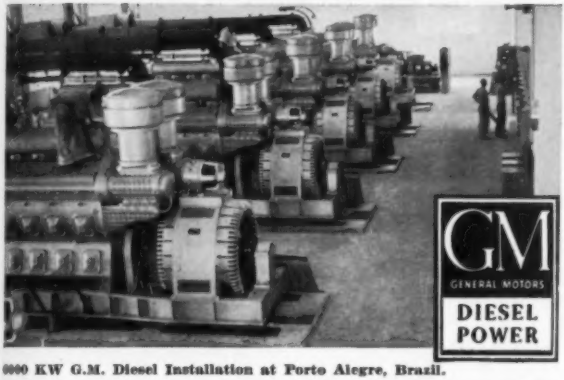

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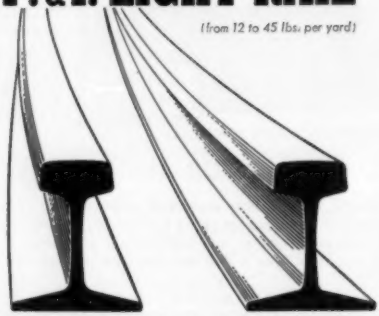

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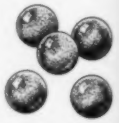

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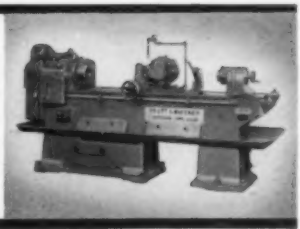

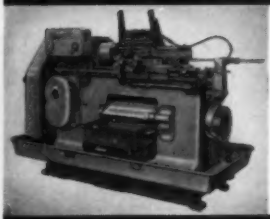

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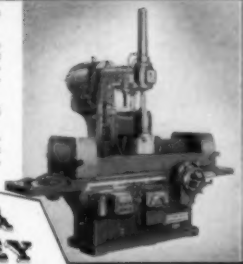

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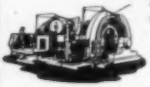

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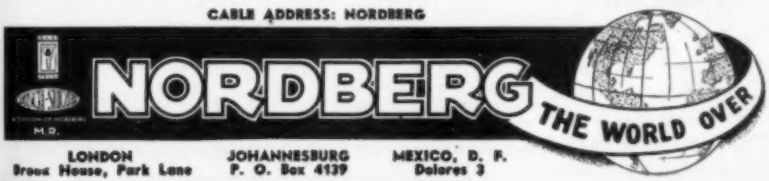

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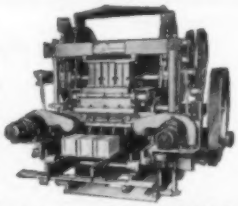

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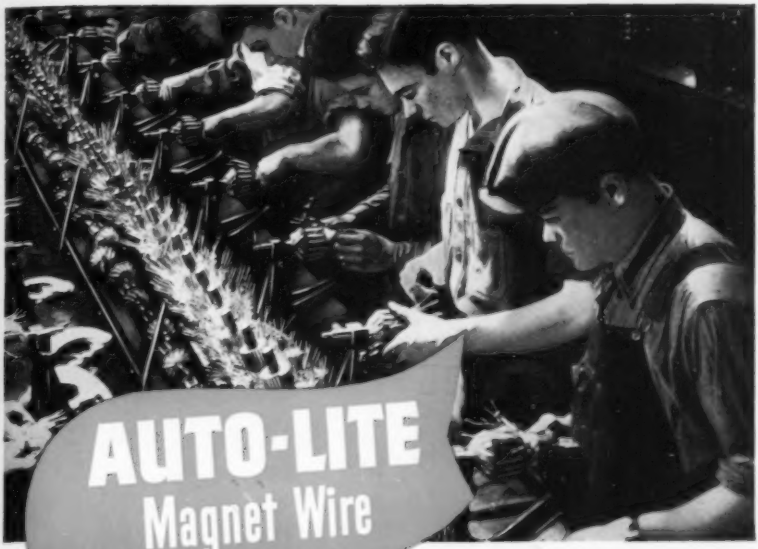

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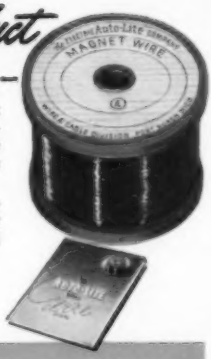

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